

Peter Magyar

Von: Adam Dąbrowski <adam.dabrowski@put.poznan.pl>
Gesendet: Dienstag, 1. September 2026 21:27
Betreff: September 16, 2026 at 9:30 AM CEST meeting of the IEEE Poland Section LMAG, "The Hourglass of Industrial Data: from Real-Time Signal Processing to AI"

Dear Ladies and Gentlemen, Dear LMAG Colleagues,

I am pleased to invite you to participate in the next meeting of our IEEE Poland Section LMAG on September 16, 2026 at 9:30 AM CEST.

I would like to inform you that the lecture entitled: "The Hourglass of Industrial Data: from Real-Time Signal Processing to AI" will be presented by Professor Marcin Andrzej Fojcik, Western Norway University of Applied Sciences (HVL), Department of Computer Science, Electrical Engineering, and Mathematical Sciences

The meeting on September 16, 2026 at 9:30 AM CEST will be organized in a hybrid form.
The link:

<https://emeeting.put.poznan.pl/eMeeting/paw-frx-owr-w28>

The address:

ul. Jana Pawła II 24, 61-131 Poznań, room 201

I am kindly asking those planning to attend this meeting in person to notify this to Ms. Monika Minc <monika.minc@put.poznan.pl> by September 14, 2026.

Best regards

Adam Dąbrowski, Chairman of the IEEE Poland Section LMAG

PS.:

Proszę Szanowne Koleżanki i Kolegów o propozycje tematów, terminów i miejsc naszych kolejnych spotkań.

Summary:

Modern industrial systems increasingly need to bridge two worlds with fundamentally different constraints: deterministic, real-time control at the shop floor and data-intensive, AI-driven analytics in the cloud. This talk argues that real-time performance is not a property that scales uniformly through the system; it exists only in a narrow "waist" between two much larger, inherently non-real-time layers. At the bottom, sensors, PLCs, and SCADA systems are constrained by energy budgets, making continuous, deterministic transmission impractical, especially in IoT and IIoT deployments. At the top, big data, AI/ML pipelines, digital twins, and LLM-based agents operate on volumes of data that preclude hard real-time guarantees. Only in between - where standards such as OPC UA FX and the emerging IEC/IEEE 60802 Time-Sensitive Networking profile now converge to provide a common data model over deterministic Ethernet - can true real-time behavior be achieved. Drawing on the presenter's work in industrial communication and Service-Oriented Architecture, as well as recent work on vision-based diagnostic systems (including the MEDUSA project for ultrasound-based synovitis detection), the talk traces how data flows from the

physical layer, through this real-time core, up to signal and image processing, edge AI, and cloud-based analytics. The talk situates this "hourglass" architecture within current standardization efforts (ISA-95:2025, RAMI 4.0/Asset Administration Shell, ISO 23247, OPC UA FX/TSN) and discusses the practical implications for designing systems that combine deterministic control with modern AI-based decision support.

Professor Marcin Andrzej Fojcik is a professor in the Department of Computer Science, Electrical Engineering and Mathematical Sciences at Western Norway University of Applied Sciences (HVL), campus Førde, Norway. His research spans automation, electronics and informatics in industrial and wireless communication, Quality of Service, and Service-Oriented Architecture: from real-time protocols and Factory 4.0 to the Internet of Things and has more recently extended into vision-based systems and AI-assisted diagnostics. He is the author of over 80 peer-reviewed publications and has served as a reviewer and on the program committee for numerous international conferences. In 2021, he received the HVL Educational Quality Award for his work on engineering education. ORCID: 0000-0002-8109-2175.