

## **Dissemination of project results**

### **Conference/symposium.**

We participated in the International Conference on Manufacturing Engineering and Materials (ICMEM 2025), held in Slovakia from June 23 to June 27, 2025. The nature of my participation was an oral presentation.

The presented paper was titled:

“Data-Driven Approaches in Non-Conventional Machining Processes: A Short Review.”

Presented by: Prof. Dr. hab. Munish Kumar Gupta

The work provided a comprehensive review of artificial intelligence (AI), machine learning (ML), and data-driven methodologies applied to advanced and non-conventional machining processes. The study critically analyzed recent developments in predictive modelling, process optimization, real-time monitoring, and intelligent control strategies within manufacturing engineering. Particular emphasis was placed on identifying research gaps in the integration of AI techniques with surface modification and non-traditional machining technologies.

The review established a structured theoretical framework linking experimental machining processes with modern computational modelling approaches. This framework directly supports my ongoing research on ultrasonically pulsating water jet (PWJ) processing and machine learning-based surface analysis. The paper highlighted the importance of combining experimental surface engineering with predictive analytics to enhance process reliability, surface integrity, and performance optimization.

Title: Predictive Modeling and Surface Analysis of Pulsating Waterjet Erosion in Biometals

Presented by: Prof. Dr. hab. Grzegorz M. Krolczyk

This paper presents a predictive modelling framework for analyzing pulsating waterjet erosion behavior in biometals, integrating experimental surface characterization with data-driven approaches. The study evaluates erosion-induced surface morphology and material response to enhance understanding of process–property relationships in biomedical-grade alloys.

During the conference, I actively engaged in technical discussions with researchers and industry experts working in manufacturing engineering, materials processing, and intelligent systems. These interactions provided valuable feedback on the modelling strategies used in my research and offered insights into potential collaborative and interdisciplinary directions.

Participation in ICMEM 2025 strengthened the international visibility of my research work and contributed to academic dissemination in the field of advanced manufacturing and intelligent machining systems. The conference presentation also helped refine the methodological framework currently being applied in my journal manuscripts under preparation.