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The strategic research agenda of the European Metrology Network Mathmet

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Key words: strategic research agenda, artificial intelligence, virtual metrology, uncertainty, data analysis

In 2014, several metrology institutes initiated the foundation of a European Centre for Mathematics and Statistics in Metrology. Three years later, the Memorandum of Understanding was signed by seven members. The aim of the centre was to aggregate, strengthen, focus and disseminate best practice in the field of mathematics and statistics in metrology. After EURAMET decided to launch metrology networks, the European Centre for Mathematics and Statistics was re-established in 2019 as Mathmet, the European Metrology Network (EMN) for mathematics and statistics in metrology. In the same year, a four-year Joint Network Project (JNP 18NET05) was launched, pursuing the following key objectives:

i. establish a stakeholder consultation process,
ii. develop a strategic research agenda, and
iii. develop quality assurance tools (data, software, guidelines).

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This talk will present Mathmet's Strategic Research Agenda (SRA) as an output of the JNP. The development of the SRA was based on stakeholder consultations and the involvement of all EMN Mathmet members.

The SRA identified cutting-edge developments in society for which mathematics and statistics will play an essential role:

i. machine learning and artificial intelligence (AI), and
ii. computational modelling and virtual metrology (VM).

Neither topic belongs to the traditional research topics in the field of mathematics and statistics in metrology but are highly relevant in the dynamic development of digital transformation, with expected impact on a plethora of applications, in the health, energy, environment and industry sectors.

Based on further stakeholder consultations and the needs of other EMNs, a classic (third) topic was included in the SRA:

iii. data analysis and quantification of uncertainty (UQ).

The talk will discuss the metrology requirements and challenges related to AI, VM and UQ and present a corresponding roadmap.

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