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The strategic research agenda of the European Metrology Network Mathmet

Sebastian Heidenreich, Markus Bär, Clemens Elster and Oliver Henze¹, Keith Lines, Susan Rhodes, Maurice Cox, Louise Wright and Peter Harris², Nicolas Fischer, Diane Gumuchian and Sebastien Marmin³, Stephen Ellison⁴, Adriaan van der Veen and Gertjan Kok⁵, Luca Zilberti, Alessandra Manzin and Francesca Pennechi⁶, Alen Bosnjakovic⁷, Joao Sousa, Carlos Pires and Olivier Pellegrino⁸, and Kirstin Vogel⁹

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).

¹Sebastian Heidenreich, Markus Bär, Clemens Elster and Oliver Henze - PTB, Abbestrasse 2-12, 10587 Berlin, Germany, e-mail: sebastian.heidenreich@ptb.de

²Keith Lines, Susan Rhodes, Maurice Cox, Louise Wright and Peter Harris - NPL, Hampton Road, Teddington TW11 0LW, UK, e-mail: peter.harris@npl.co.uk

³Nicolas Fischer, Diane Gumuchian and Sebastien Marmin - LNE, 1 rue Gaston Boissier, 75724 Paris Cedex 15, France, e-mail: Nicolas.Fischer@lne.fr

⁴Stephen Ellison LGC Limited, Queens Road, Teddington, TW11 0LY, UK, e-mail: S.Ellison@LGCGroup.com

⁵Adriaan van der Veen and Gertjan Kok VSL B.V., Thijsseweg 11, 2629 JA, Delft, the Netherlands, e-mail: GKok@vsl.nl

⁶Luca Zilberti, Alessandra Manzin and Francesca Pennechi
INRIM, Strada delle Cacce 91, 10135 Turin, Italy, e-mail: f.pennechi@inrim.it

⁷Alen Bosnjakovic IMBIH, Augusta Brauna 2, 71000 Sarajevo, e-mail: alen.bosnjakovic@met.gov.ba

⁸Joao Sousa, Carlos Pires and Olivier Pellegrino

IPQ, Rua António Gião, 2, 2829-513 Caparica, Portugal, e-mail: jasousa@ipq.pt

⁹Kirstin Vogel BAM, Unter den Eichen 87, 12205 Berlin, Germany, e-mail: kristin.vogel@bam.de

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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