



## ISTITUTO NAZIONALE DI RICERCA METROLOGICA Repository Istituzionale

The strategic research agenda of the European Metrology Network Mathmet

*Original*

The strategic research agenda of the European Metrology Network Mathmet / Heidenreich, Sebastian; Bär, Markus; Elster, Clemens; Henze, Oliver; Lines, Keith; Rhodes, Susan; Cox, Maurice; Wright, Louise; Harris, Peter; Fischer, Nicolas; Gumuchian, Diane; Marmin, Sebastien; Ellison, Stephen; van der Veen, Adriaan; Kok, Gertjan; Zilberti, Luca; Manzin, Alessandra; Pennechi, Francesca; Bosnjakovic, Alen; Sousa, Joao; Pires, Carlos; Pellegrino, Olivier; Kirstin Vogel, And. - (2023), pp. 94-95. (Intervento presentato al convegno ENBIS and EMN Mathmet Joint Workshop Mathematical and Statistical Methods for Metrology Terms of use: This article is made available under the CC-BY 4.0 International license since: 2024-02-21T16:43:49Z

*Publisher:*

*Published*  
DOI:

*Terms of use:*

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

*Publisher copyright*

(Article begins on next page)



# The strategic research agenda of the European Metrology Network Mathmet

Sebastian Heidenreich, Markus Bär, Clemens Elster and Oliver Henze<sup>1</sup>, Keith Lines, Susan Rhodes, Maurice Cox, Louise Wright and Peter Harris<sup>2</sup>, Nicolas Fischer, Diane Gumuchian and Sebastien Marmin<sup>3</sup>, Stephen Ellison<sup>4</sup>, Adriaan van der Veen and Gertjan Kok<sup>5</sup>, Luca Zilberti, Alessandra Manzin and Francesca Pennechi<sup>6</sup>, Alen Bosnjakovic<sup>7</sup>, Joao Sousa, Carlos Pires and Olivier Pellegrino<sup>8</sup>, and Kirstin Vogel<sup>9</sup>

**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).

---

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

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

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

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

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

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

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

<sup>8</sup>Joao Sousa, Carlos Pires and Olivier Pellegrino

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

<sup>9</sup>Kirstin 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.

#### Acknowledgement

The JNP 18NET05 Mathmet has received funding from the European Union's Horizon 2020 research and innovation programme.