

ENBIS - Mathmet

MSMM 2023

Mathematical and Statistical Methods for Metrology



PROGRAMME
30-31 MAY 2023

30 MAY - FIRST DAY

TIME (CEST) *

08.00 - 09.00	<p>Registration at the INRiM  Strada delle Cacce 91, 10135 TORINO</p>
09.00 - 09.15	<p>INRiM and Politecnico di Torino welcome  Room: Conference Hall</p> <p>Francesca Pennechi (MSMM 2023 co-chair, Istituto Nazionale di Ricerca Metrologica, IT), Pietro Asinari (Scientific Director of the Istituto Nazionale di Ricerca Metrologica, IT) and Enrico Bibbona (DISMA, Politecnico di Torino, IT)</p>
09.15 - 09.30	<p>ENBIS and Mathmet welcome  Room: Conference Hall</p> <p>Antonio Pievatolo (MSMM 2023 co-chair, ENBIS Past President, IMATI-CNR) and Alistair Forbes (ENBIS SIG on Measurement Uncertainty co-chair, National Physical Laboratory, UK), Francesca Pennechi (MSMM 2023 co-chair, EMN Mathmet Chair) and Nicolas Fischer (EMN Mathmet Vice-Chair, Laboratoire national de metrologie et d'essais, FR)</p>
09.30 - 10.20	<p>Invited speaker - Lorenzo Tamellini, Institute of Applied Mathematics and Information Technologies "Enrico Magenes" (CNR-IMATI Pavia, IT)</p> <p><i>A multi-fidelity method for uncertainty quantification in engineering problems - Chair: Antonio Pievatolo</i>  Room: Conference Hall</p>
10.20 - 10.40	<p style="text-align: center;">COFFEE BREAK</p>
10.40 - 11.05	<p>MATHMET Project - Chair: Nicolas Fischer  Room: Conference Hall</p> <p>ID 122 The strategic research agenda of the European Metrology Network Mathmet Sebastian Heidenreich - Physikalisch-Technische Bundesanstalt, DE</p>
11.05 - 11.30	<p>ID 126 Mathmet Quality Assurance Tools for data, software, and guidelines Keith Lines - National Physical Laboratory, UK</p> <p>Applications of Machine Learning Methods for Solving Inverse Problems Chair: Philipp Benner  Room: Conference Hall</p>
11.30 - 11.50	<p>ID 53 Invertible neural networks for estimating electron densities from X-ray scattering measurements Philipp Benner - Bundesanstalt für Materialforschung und -prüfung, DE</p>
11.50 - 12.10	<p>ID 123 Reconstructions of nano-geometries from grazing incidence X-Ray fluorescence measurements using neural networks Sebastian Heidenreich - Physikalisch-Technische Bundesanstalt, DE</p>
12.10 - 12.30	<p>ID 70 Determining radius and refractive index of nanoparticles using machine learning Federica Gugole - Nationaal Metrologisch Instituut, NL</p>
12.30 - 12.50	<p>ID 76 Predicting Equivalent Electrical Circuits from Electrochemical Impedance Spectroscopy (EIS) Data with Convolutional Neural Networks and Global Optimization Alexander Kister - Bundesanstalt für Materialforschung und -prüfung, DE</p>
12.50 - 14.00	<p style="text-align: center;">LUNCH BREAK - EXPO ROOM</p>

* ORAL PRESENTATION - all time listed are CEST (UTC+2)

PARALLEL SESSIONS

ROOM: CONFERENCE HALL

Design and optimisation methods

Chair: Enrico Bibbona

ID 58 *Bridging the Gap between Design and Metrology using Statistical Tolerance Analysis*

14.00 - 14.20

Mattia Maltauro - Department of Management and Engineering, University of Padova, IT

ID 18 *Simulated Annealing for Covariate-Adaptive Designs*

14.20 - 14.40

Marco Novelli - Department of Statistical Sciences, University of Bologna, IT

ID 81 *A procedure for optimal designs and modeling in technological processes: a case-study on freight trains*

14.40 - 15.00

Nedka D. Nikiforova - Department of Statistics Computer Science Applications "G. Parenti", University of Florence, IT

ID 55 *Improving cancer diagnosis times by optimising resource allocation*

15.00 - 15.20

Elizabeth A. Cooke - National Physical Laboratory, UK

Industrial applications

Chair: Gianfranco Genta

ID 96 *Subjective vs objective assembly complexity assessment: a comparative study in a Human Robot Collaboration framework*

15.20 - 15.40

Elisa Verna - DIGEP, Politecnico di Torino, IT

ID 155 *The thermal dynamics of a brake pad, and the estimation of its thermal parameters*

15.40 - 16.00

Francesca Collini - DISMA, Politecnico di Torino, IT

ROOM: SEMINAR ROOM

Conformity assessment

Chair: Francesca Pennecchi

ID 26 *Advanced methods for assessment of chemical compositions of multicomponent substances or materials and their categorical property values*

14.00 - 14.20

Ilya Kuselman - Independent Consultant on Metrology, IL

ID 97 *How do asymmetric measurement distributions affect risks in conformity assessment?*

14.20 - 14.40

Stephen L R Ellison - LGC limited, UK

Longitudinal data and time series

Chair: Marco Coisson

ID 38 *Modeling Lifetime Drift of Discrete Electrical Parameters for Automotive Semiconductors*

14.40 - 15.00

Lukas Sommeregger - Infineon Technologies Austria AG, AT

ID 125 *Forecasting oxygen content in seawater*

15.00 - 15.20

Gianfranco Durin - Istituto Nazionale di Ricerca Metrologica, IT

Reference data

Chair: Alistar Forbes

ID 128 *Towards Reference Point Cloud Generation for Data Fusion in Dimensional Metrology*

15.20 - 15.40

Ferdinand Lafon - Laboratoire Commun de métrologie et d'essais, FR

ID 132 *Reference data for Electrical Resistance Tomography*

15.40 - 16.00

Alessandro Cultrera - Istituto Nazionale di Ricerca Metrologica, IT

16.00 - 16.30

COFFEE BREAK & POSTER SESSION

ROOM: EXPO ROOM

ROOM: CONFERENCE HALL

Uncertainty and regression problems

Chair: Walter Bich

ID 88 *On the dB-to-linear conversion*

16.30 - 16.50

Luca Callegaro - Istituto Nazionale di Ricerca Metrologica, IT

ID 121 *Data smoothing and its application to the evaluation of the measurement uncertainty in a humidity standard*

16.50 - 17.10

Rezvaneh Nobakht - Istituto Nazionale di Ricerca Metrologica, IT

ID 103 *Callendar Van Dusen interpolation by means of Piecewise Constrained Least Squares with nullspace method - an update*

17.10 - 17.30

Graziano Coppa - Istituto Nazionale di Ricerca Metrologica, IT

ROOM: SEMINAR ROOM

Methods for dosimetry

Chair: Stephen Ellison

ID 50 *Meta-analysis of dosimetry audits*

16.30 - 16.50

Ellie L. Smyth - National Physical Laboratory, UK

ID 56 *Sensitivity Analysis for Gamma Index Calculations in Dosimetry Audits for Advanced Radiotherapy*

16.50 - 17.10

Nadia Smith - National Physical Laboratory, UK

Methods for Electric Properties Tomography

Chair: Oriano Bottauscio

ID 68 *Repeatability and Reproducibility Uncertainty Assessment in Magnetic Resonance-based Electric Properties Tomography of a Homogeneous Phantom*

17.10 - 17.50

Alessandro Arduino - Istituto Nazionale di Ricerca Metrologica, IT

ID 84 *Electric Properties Tomography via Green's Integral Identity*

17.10 - 17.30

Alessandro Arduino - Istituto Nazionale di Ricerca Metrologica, IT

Luca Zilberti - Istituto Nazionale di Ricerca Metrologica, IT

17.30 - 17.50



Social dinner

Venue: Kipling Restaurant & Wines

Via Giuseppe Mazzini, 10 - 10123 Torino

19.30 - 22.00

31 MAY - SECOND DAY

TIME (CEST) *

08.30 - 09.00	Registration at the INRiM 📍 Strada delle Cacce 91, 10135 TORINO
09.00 - 09.10	Welcome to day 2 📍 Room: Conference Hall
09.10 - 10.00	Francesca Pennecchi (MSMM 2023 co-chair, Istituto Nazionale di Ricerca Metrologica, IT) Invited speaker - Botond Tibor Szabó , Bocconi University, Department of Decision Sciences (Milano, IT) <i>On the theoretical understanding of Bayesian methods in complex models</i> Chair: Francesca Pennecchi 📍 Room: Conference Hall
10.00 - 10.20	Methods for Deep Learning Chair: Sebastian Heidenreich 📍 Room: Conference Hall ID 112 GUM-compliant uncertainty propagation for deep neural networks Björn Ludwig - Physikalisch-Technische Bundesanstalt, DE
10.20 - 10.40	ID 93 Efficient learning of the copula distribution using WGANs Jorg Martin - Physikalisch-Technische Bundesanstalt, DE

10.40 - 11.20

COFFEE BREAK & POSTER SESSION

ROOM: EXPO ROOM

PARALLEL SESSIONS

📍 ROOM: CONFERENCE HALL

11.20 - 11.40	iMet-MRI Project Chair: Nadia Smith ID 65 T2 or not T2? A new tool for consistent processing of qMRI parameters Jack D. Clarke - National Physical Laboratory, UK
11.40 - 12.00	ID 111 An efficient way to generate synthetic spin echo signals by the extended phase graph Asante Ntata - National Physical Laboratory, UK
12.00 - 12.20	ID 129 Simulation of acquisition process in Magnetic Resonance Imaging to support standardization Riccardo Ferrero - Istituto Nazionale di Ricerca Metrologica, IT
12.20 - 12.40	Bayesian methods Chair: Gianfranco Durin ID 108 Separation of effects associated with measurement data Alistair Forbes - National Physical Laboratory, UK
12.40 - 13.00	ID 80 Investigation of a Bayesian approach for the calibration of large batches of sensors Andrea Prato - Istituto Nazionale di Ricerca Metrologica, IT

📍 ROOM: SEMINAR ROOM

11.20 - 11.40	ViDit Project Chair: Sonja Schmelter ID 71 Challenges related with Virtual Experiments in Metrology Gertjan Kok - VSL, NL
11.40 - 12.00	ID 113 Trustworthy virtual experiments and digital twins (ViDiT) - Uncertainty evaluation for Digital Twins Giacomo Maculotti - DIGEP, Politecnico di Torino, IT
12.00 - 12.20	ID 130 Monte Carlo simulations for uncertainty estimation of error separation techniques Saint-Clair T. Toguem - Laboratoire national de metrologie et d'essais, FR
12.20 - 12.40	Modelling for engineering applications Chair: Maurizio Galetto ID 42 Multilayer Delamination Model Kirill Ivanov - Infineon Technologies Austria AG, AT

13.00 - 14.00

LUNCH BREAK - EXPO ROOM

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ROOM: CONFERENCE HALL

QUIERO Project

Chair: Luca Zilberti

ID 106 *Physiological variability in brain electric conductivity: correcting the effect of the age for the detection of pathological alterations*

14.00 - 14.20

Sebastien Marmin - Laboratoire national de métrologie et d'essais, FR

ID 114 *Combining experimental design with digital twin and phantom experiments to optimise data acquisition for magnetic resonance fingerprinting (MRF)*

14.20 - 14.40

Stephen L.R. Ellison - LGC Limited, UK

ID 127 *Myocardial Fibrosis Segmentation from MRF Images*

14.40 - 15.00

Aleksander Sadikov - Faculty of Computer and Information Science, University of Ljubljana, SI

ROOM: SEMINAR ROOM

RaCHy Project

Chair: Alessandra Manzin

ID 107 *A machine learning approach for the estimation of magnetic nanoparticles specific loss power*

14.00 - 14.20

Riccardo Ferrero - Istituto Nazionale di Ricerca Metrologica, IT

ID 120 *In silico experiments to investigate the heating efficiency of magnetic nanoparticles in hyperthermia preclinical tests*

14.20 - 14.40

Marta Vicentini - Istituto Nazionale di Ricerca Metrologica, IT

ID 124 *Thermo-acoustic simulation in ultrasound hyperthermia applications*

14.40 - 15.00

Silvia Pozzi - National Center for Radiation Protection and Computational Physics, Italian National Institute of Health, IT

PLENARY SESSION

ROOM: CONFERENCE HALL

Explainable Deep Learning

Chair: Gertjan Kok

ID 87 *Explainable deep learning inference to decode decision-making processes from multidimensional patterns of neural activities*

15.00 - 15.20

Andrea Ciardiello - "Sapienza" University of Rome, IT

ID 94 *From "Wich" to "Why": Interpretation map for Explainable Deep Learning based on Influence methods*

15.20 - 15.40

Andrea Ciardiello - "Sapienza" University of Rome, IT

15.40 - 16.00

CONCLUSIONS

Conference Hall

ONE LAST COFFEE

ROOM: EXPO ROOM

30/05
16.00 - 16.30

POSTER SESSION

Room: Expo Room

31/05
10.40 - 11.20

POSTER SESSION

Room: Expo Room

ID 28

Black-Box Uncertainty Estimation of Machine Learning Models

Georgi Tancev - Federal Institute of Metrology METAS, CH

ID 45

Quantitative analysis and processing of surfaces and profiles from profilometry images

Andrea Giura - Istituto Nazionale di Ricerca Metrologica, IT

ID 51

Ensuring the validity of measurement results through the use of triangulation rules

Iulian Mihai - Istituto Nazionale di Ricerca Metrologica, IT

ID 101

PyES - an open source software for the computation of in solution and precipitation equilibria

Lorenzo Castellino - University of Turin, IT

ID 105

Obsidian sourcing by combining SEM images and machine learning

Marco Coisson - Istituto Nazionale di Ricerca Metrologica, IT

ID 115

ViDiT project "Trustworthy virtual experiments and digital twins"

Sonja Schmelter - Physikalisch-Technische Bundesanstalt, DE

ID 156

Employing machine learning models to enhance the prediction of cocrystals formation

Eugenio Alladio - University of Turin, IT