International Congress on Measurement, Quality and Data Science

June 5-7, 2023 - Bordeaux (France)

MQDS 2023

FORUMESURE

PROGRAMME

Venue:
Hilton Garden Inn hotel
17 Allée de Rio, 33800 Bordeaux, France

Brunel University London

université angers

université de BORDEAUX

CAFMET

POLYTECH ANGERS

LARIS

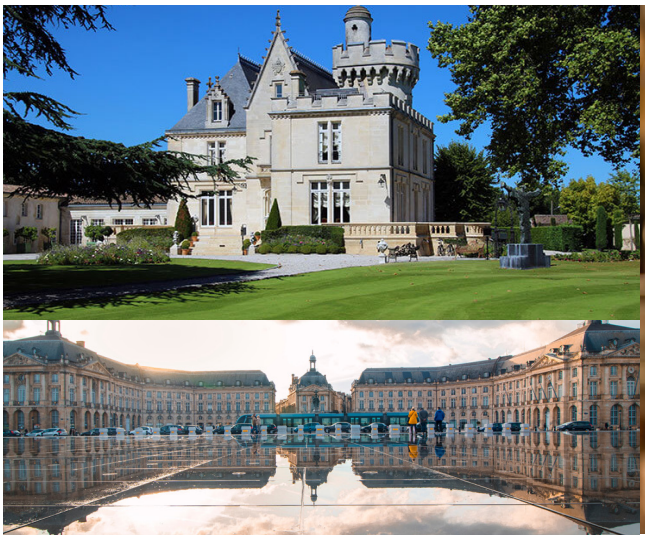
ims

www.mq-datascience.com

Congress venue

HILTON GARDEN INN BORDEAUX CENTRE

17 allée de Rio
33800 - Bordeaux
France



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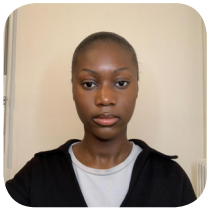
DALOBA

+33 6 73 62 32 62 contact@mq-datascience.com or contact@cafmet.com

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Cafmet-Association

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The International Congress on Measurement, Quality and Data Science (MQDS) is a unique and innovative multidisciplinary event.

MQDS 2023 is a congress that brings together scientists and industrialists interested in topical issues that are extremely important for our future and our planet. We must produce and innovate differently to preserve our environment. MQDS 2023 allows for the exchange of information on scientific fields that are essential for sustainable development and for the industry of the future.

The keys to our success lie in controlling the risks associated with our eco-design, co-development and production methods, taking into account technological developments and climate change.

How can we ensure the quality, reliability, safety and recyclability of products and systems throughout their life cycles, while respecting appropriate specifications that are in line with the environment? What data are we basing on? Measured and/or simulated data? Are the data reliable? How is it measured? Can Artificial Intelligence (without regulation and control) answer all these fundamental questions correctly? If not, what should be done? I am convinced that the MQDS congress will provide interesting answers to these questions.

MQDS 2023 is organized in a very beautiful French region where life is good. France has always been a pioneer in many aspects of culture, science and technology, and is recognized for its cultural heritage and the quality of its products. France has unique values and is an admirable land of hospitality. Bordeaux is one of the cities that represent the culture and history of France. Enjoy MQDS 2023 and Bordeaux!

Dr. Abdérafi CHARKI

MQDS 2023 Chairman - Abdérafi CHARKI

Dr. Abdérafi CHARKI is a professor at POLYTECH Angers (an engineering school at the University of Angers) where he teaches mechanical engineering, quality engineering, risk and environmental management and metrology. He worked in the automotive industry and at COFRAC (French Accreditation Committee) before joining POLYTECH Angers in 2004. His research experiences include reliability, quality engineering, uncertainty evaluation, lifetime and life-cycle assessment of products and systems. He is also quality and metrology assessor for COFRAC. He published more than 100 papers and supervised 11 PhD students. He has led and co-led several research projects funded by EU, the French National Research Agency and industry. He founded the African Committee of Metrology and the International Journal of Metrology and Quality Engineering.

MQDS 2023 Chairs

On behalf of the Organizing Committee, it is our great pleasure to welcome you to the International Congress on Measurement, Quality, and Data Science (MQDS 2023), to be held in Bordeaux. This Congress will bring together leading scholars, researchers, and industry experts from around the world to discuss and share their latest insights and innovations in the field of measurement, quality, and data science. It offers a great opportunity for participants to engage in insightful discussions, exchange ideas, and establish meaningful connections with their peers from academia, industry, and government agencies. We are confident that this Congress will inspire new collaborations, and contribute to the advancement of knowledge in the field of measurement, quality, and data science.

We would like to express our sincere gratitude to the Organizing Committee and the CAFMET for their hard work and dedication in putting together this Congress. We would also like to extend our appreciation to the Scientific Committee for their invaluable contributions in developing the Congress Program and ensuring its academic rigor.

We hope you enjoy your stay in Bordeaux, a city renowned for its rich history, culture, and wine. We wish you all a fruitful and enjoyable conference experience.

Dr. QingPing YANG

MQDS 2023 Co-Chairman - QingPing YANG

Dr QingPing Yang is currently a Reader at Brunel University London (BUL), leading Brunel Quality Engineering and Smart Technology (QUEST) Research Group, and Robotics and Automation Research Group. He was educated in Instrumentation and Measurement Technology at Chengdu Aeronautical Polytechnic and in Robot Control and Intelligent Control (MSc Program) at Northwestern Polytechnical University. He worked for an Aircraft Structure Research Institute (AVIC, Xi'an) for four years before joining the Brunel Centre for Manufacturing Metrology (BCMM) in late 1988 as a visiting scholar. In 1989, he was awarded an ORS Award and a PhD Studentship from British Technology Group to develop a patented smart 3D high precision probe system for CMMs, and received his PhD degree in October 1992. His research experiences include sensors, dimensional metrology, quality engineering, robotics, smart systems and AI. Over the last three decades, he has developed a unique and coherent research field broadly integrating metrology, quality engineering and smart technologies (including AI and robotics), published more than 110 papers and supervised (as the first supervisor) 27 PhD students in these areas. He has led a number of research projects funded by EU, UK government and industry with a total funding of about £2.5 million as PI. Dr Yang has received numerous prizes and awards for outstanding academic and work performance in the past. He has been a member of IEEE and IET.

Organizing Committee

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G. CALCHERA, Cirad, France
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D. DIGUET, CAFMET Angers, France
Y. DUCQ, University of Bordeaux, France
A. FORBES, National Physical Laboratory, United Kingdom
H-Z. HUANG, University of Electronic Science and Technology, China
A. JAULIN, INRAE, France
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L. ROSSARD, CAFMET Angers, France
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M-K. TRAORE, University of Bordeaux, France
S. VERRON, University of Angers, France
Q. YANG, Brunel University London, United Kingdom

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A. ELSAYED, University of Rutgers, United States
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A. FORBES, National Physical Laboratory, United Kingdom
M. HIMBERT, LNE-LCM-CNAM, France
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T. NGEE GOH, University of Singapore, Singapoure
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S-N. PARK, Korea Research Institut of Standards and Science
F. PAVESE, National Research Council, Italy
M. PILLET, University of Savoie Mont Blance, France
D. PRAJAPATI, PEC University of Standards and Technology, India
S. PUYDARRIEUX, ORANO, France
Q. QI, University of Huddershield, United Kingdom
P-K. RACHAKONDA, NIST, United States
C. ROBERTO HALL BARBOSA, University or Rio de Janeiro, Brazil
G. ROUSSEAU, IBM, France
L. SAINTIS, University of Angers, France
P-J. SCOTT, University of Huddershield, United Kingdom
M-F. THEVENON, University of Montpellier, France
W. TOUAYAR, Insa, Tunisia
M-K. TRAORE, University of Bordeaux, France
S. VERRON, University of Angers, France
Q. YANG, Brunel Univeristy London, United Kingdom
Q. WANG, China Jiliang University
N. YUSA, Tohoku University, Japan

MQDS 2023 Objectives

The CAFMET is organizing the first International Congress on Measurement, Quality and Data Science (MQDS) in Bordeaux-France. MQDS is a forum to share informations, ideas and experiences between manufacturers, universities and laboratories.

During this congress, you will have the opportunity to develop and acquire new skills during conferences, technical workshops, posters sessions and the FORUMESURE 2023 exhibition.

The program covers important topics for industry and research in the field of metrology, quality and data siences. Currently, the program is structured on three pillars: Measurement, Quality and Data Science. Regarding metrology, it supports the critical demands of the industrial competitiveness and promotes quality in its broad sense, focusing on products, people certification, social responsibility, and quality systems. Broadly speaking, it explores science, technology and measurement interfaces, and unveils new borders in an emerging society, boosted by an entrepreneur spirit, based on knowledge and creativity.

- To facilitate communications between industry, government agencies, institutions of higher education and research laboratories in fields of measurement, quality and data science
- To present the evolution of measurement methods in engineering, energy, environment, food, health and research
- To provide a forum for exchanges between professionals and future professionals in order to develop the skills of each in measurement, quality and data science
- To highlight the importance of data science tools in quality engineering management and measurement for quality, reliability, safety, maintenance, system optimization, visual management, performance management.

MQDS 2023 Programme Overview

8:00 - 8:30 | 10:30 - 11:00 | 12h30 -

MONDAY, 05/06/23

WELCOME RECEPTION

WELCOME CEREMONY

S0: OPENING SPEECHES
Room: MERLOT

S0: OPENING SESSION
Room: Merlot

LUNCH

TUESDAY, 06/06/23

WELCOME RECEPTION

S2-1: **SAFETY, RELIABILITY AND QUALITY**
Conference, Room: SAINT-ÉMILION

S3: **DATA AND APPLICATIONS IN RESEARCH AND INDUSTRY**
Conference, Room: GRAVES

T1: **UNCERTAINTY EVALUATION**
Tutorial, Room: MEDOC

T2: **DATA SCIENCE, ARTIFICIAL INTELLIGENCE AND METROLOGY**
Tutorial, Room: CABERNET

S2-1: **SAFETY, RELIABILITY AND QUALITY**
Conference, Room: SAINT-ÉMILION

S3: **DATA AND APPLICATIONS IN RESEARCH AND INDUSTRY**
Conference, Room: GRAVES

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T2: **DATA SCIENCE, ARTIFICIAL INTELLIGENCE AND METROLOGY**
Tutorial, Room: CABERNET

LUNCH

FORUMESURE 2023 EXHIBITION INAUGURATION

WEDNESDAY, 07/06/23

WELCOME RECEPTION

S6: **INDUSTRY 4.0 AND FUTURE INDUSTRY**
Conference, Room: SAINT-ÉMILION

T4: **DATA ANALYSIS**
Tutorial, Room: GRAVES

T5: **METROLOGY ASSESSMENT IN A LABORATORY**
Tutorial, Room: MEDOC

T6-1: **OPTIMIZATION FOR MAINTAINING COMPLEX SYSTEMS IN OPERATIONAL CONDITIONS**
Tutorial, Room: CABERNET

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Tutorial, Room: CABERNET

LUNCH

FORUMESURE 2023 & POSTERS

June 05-07, 2023

- 2:00 | 4:00 - 4:30 | 6:00

LUNCH

S1: PLENARY SESSION
Room : MERLOT

S1: PLENARY SESSION
Room : MERLOT

LUNCH

S2-2: **SAFETY, RELIABILITY AND QUALITY**
Conference, Room: SAINT-ÉMILION

S4: **HEALTH AND ENVIRONMENT**
Conference, Room: MEDOC

S5: **MANUFACTURING AND ENGINEERING**
Conference, Room: GRAVES

T3: **USE OF OPEN DATA**
Tutorial, Room: CABERNET

RD1: **METROLOGY IN AFRICA AND FUTURE CHALLENGES**
Round table, Room: SAINT-ÉMILION

S4: **HEALTH AND ENVIRONMENT**
Conference, Room: MEDOC

S5: **MANUFACTURING AND ENGINEERING**
Conference, Room: GRAVES

T3: **USE OF OPEN DATA**
Tutorial, Room: CABERNET

GALA

FORUMESURE 2023 EXHIBITION & POSTERS

LUNCH

S7: **ENERGY AND BUILT ENVIRONMENT**
Conference, Room: SAINT-ÉMILION

T6-2: **OPTIMIZATION FOR MAINTAINING COMPLEX SYSTEMS IN OPERATIONAL CONDITIONS**
Tutorial, Room: CABERNET

T7: **MEASUREMENT MANAGEMENT IN ACCORDANCE WITH ISO 10012**
Tutorial, Room: GRAVES

RD2: **THE INDUSTRY OF THE FUTURE: NEW SKILL REQUIREMENTS FOR QUALITY AND METROLOGY**
Round table, Room: MEDOC

S7: **ENERGY AND BUILT ENVIRONMENT**
Conference, Room: SAINT-ÉMILION

T6-2: **OPTIMIZATION FOR MAINTAINING COMPLEX SYSTEMS IN OPERATIONAL CONDITIONS**
Tutorial, Room: CABERNET

T7: **MEASUREMENT MANAGEMENT IN ACCORDANCE WITH ISO 10012**
Tutorial, Room: GRAVES

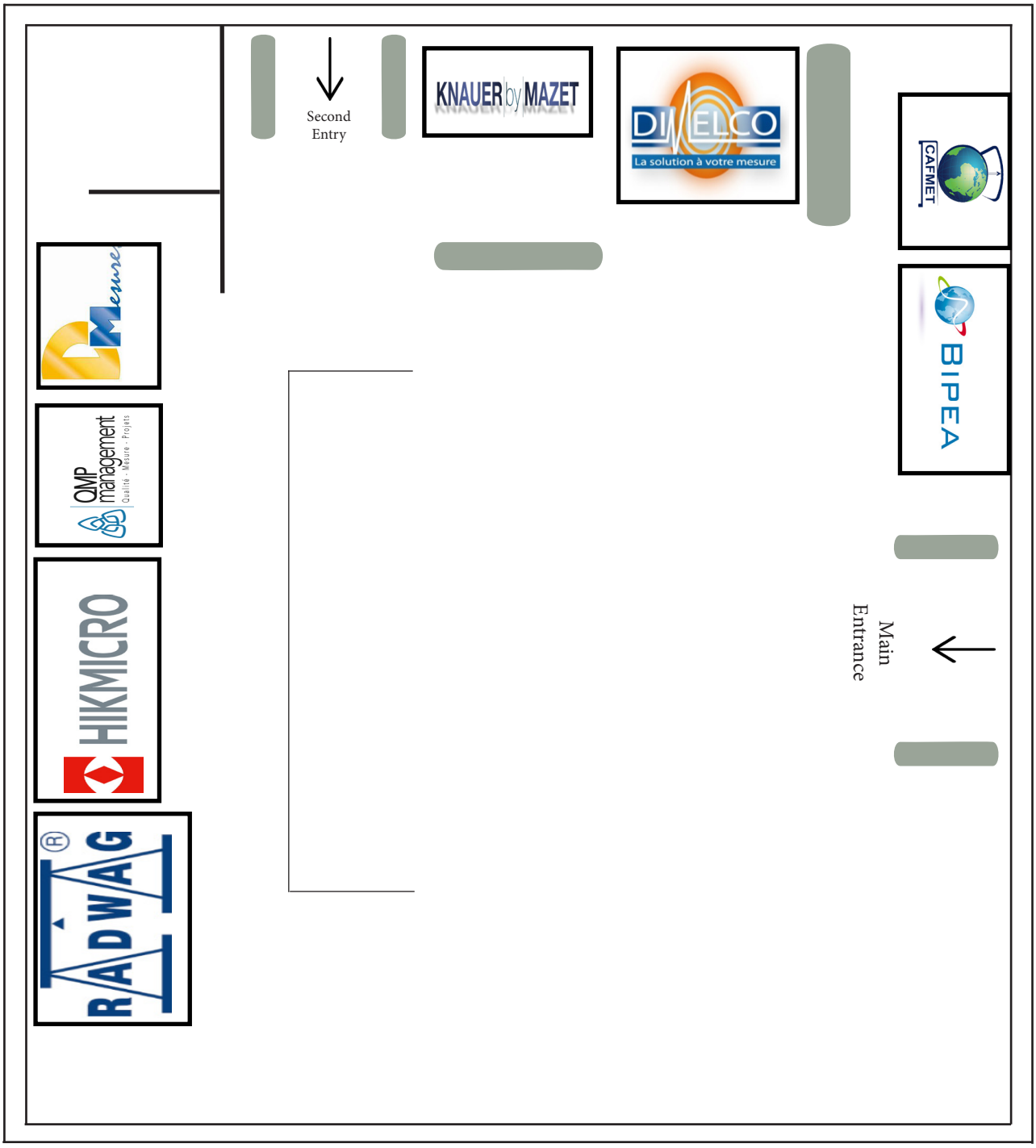
CAFMET GENERAL ASSEMBLY
Room: MEDOC

CLOSING CEREMONY AWARDS
Room: SAINT-ÉMILION

FORUMESURE 2023 EXHIBITION & POSTERS

FORUMESURE is an annual exhibition on Instrumentation, Measurement and Data organized by CAFMET. It concerns companies which want to show their expertise, new products and services.

Booths Map



FORUMESURE EXHIBITORS

1 CAFMET www.cafmet.com

2 BIPEA www.bipea.org

3 DIMELCO www.dimelco.com

4 KNAUER BY MAZET www.knauer.fr

5 DOERLER MESURES www.dmesures.fr

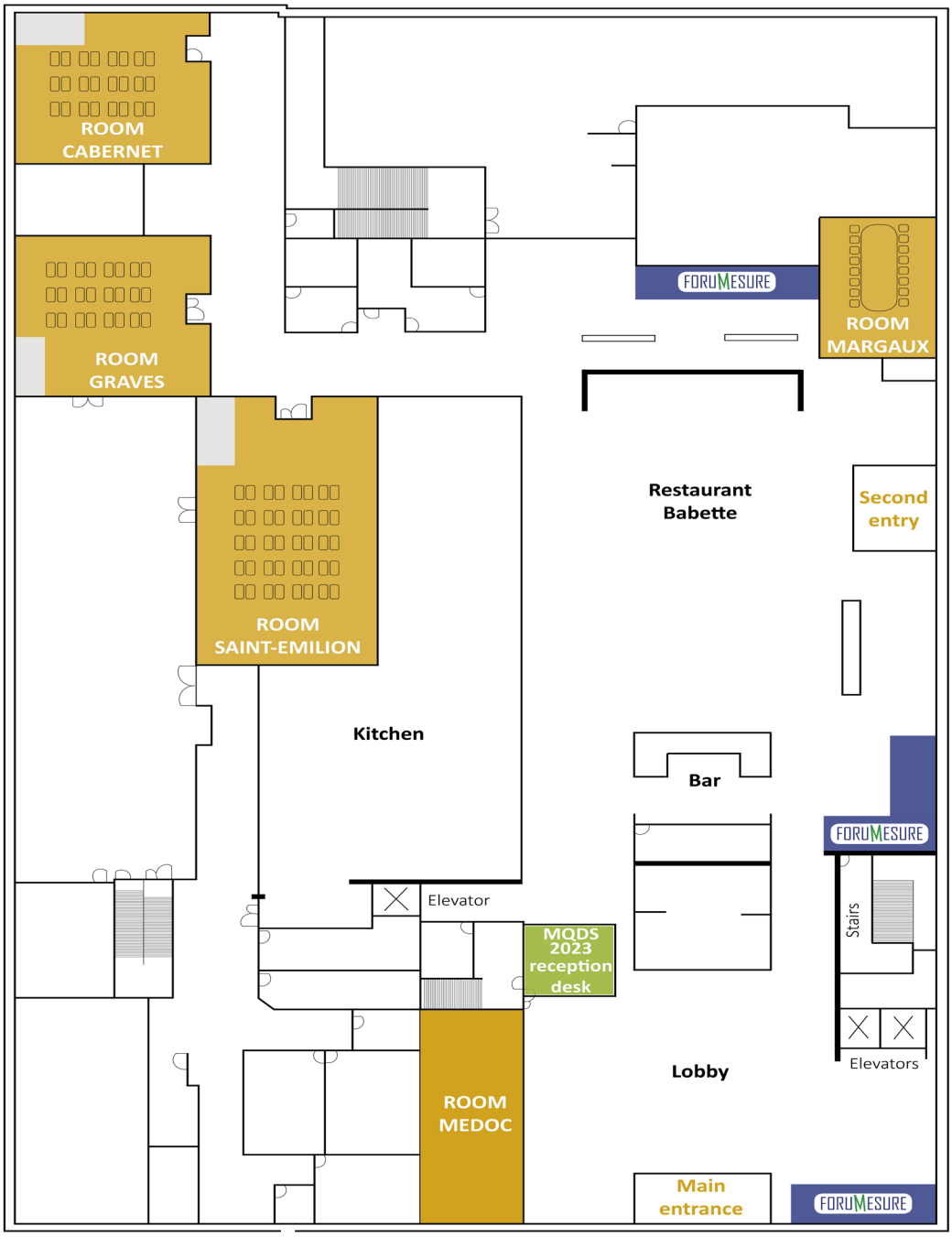
6 QMP www.qmp-management.net

7 HIKVISION www.hikvision.com

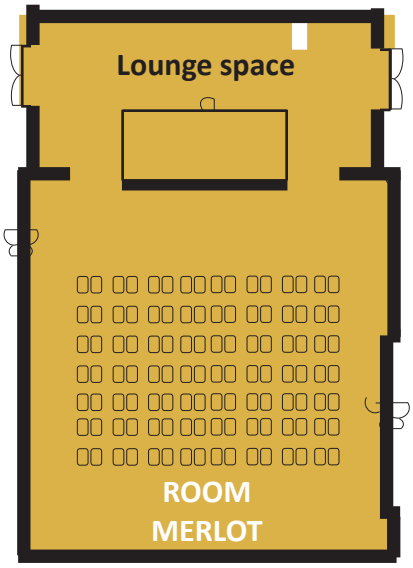
8 RADWAG www.radwag.com

Rooms map

Here is a map of the place and space where the conferences and tutorials will take place.



Ground Floor



1st Floor

MQDS 2023 Partners

Brunel University London is a leading research-intensive institution that offers a wide range of UG/PG courses. The university has established itself as a leader in research and innovation, with a particular focus on technology, engineering, and design. The university is known for its strong industry links and practical approach to learning, with a diverse community of students from over 110 countries.

Polytech Angers is the engineering school of the University of Angers and is part of the Polytech network. This double supervision provides its students with the guarantee of a training based on advanced research and the legibility of a Polytech diploma recognized nationally.

The University of Angers offers 450 diplomas in every key discipline. Today UA is the educational institution that has the highest number of vocational bachelor's degrees in Western France. It is well established in the local region and works in close partnership with its socio-economic partners. With over 300 international partners across the globe and an ever-growing list of dual degrees, the University of Angers has a definite international dimension

The University of Bordeaux offers a multidisciplinary and international university model, with deep roots in the region. Boasting a wide range of programmes, backed by first-rate research with a strong potential for innovation, the university is striving to stand out for its ability to experiment with environmental and societal transitions and its commitment to the well-being of its community members, whether they are studying or working.

IMS (Integration: from Material to Systems) laboratory was funded in 2007, by merging three research units: IXL, PIOM and LAPS. IMS brings together fundamental research, engineering and technology, emphasizing an integrative systems approach in the disciplines of Information Technologies. IMS is a joint research unit for the French National Center for Scientic Research (CNRS), University of Bordeaux and Bordeaux INP. In CNRS, IMS is affiliated to the Institute for Engineering and Systems Sciences (INSIS) and to the Institute for Information Sciences and Technologies (INS2I).

The LARIS laboratory is a multidisciplinary research unit in Science and Technology belonging to the University of Angers (UA). The methods developed by LARIS and the innovate solutions proposed enable us to respond effectively to the need for operational knowledge and expertise. We encourage the development of scientific work that mainly relies on the skills of Information and Communication Sciences and Technologies (ICST), while associating, for certain themes or fields of application, those of Engineering Sciences and Life Sciences.

EDP Sciences publishes high-quality scientific journals, conferences proceeding, books and magazines in a broad range of scientific, technical and medical disciplines. Subject areas include: physics, astrophysics, mathematics, engineering sciences, life sciences, medicine, humanities.

Created by a scientist for scientists, «La Gazette du LABORATOIRE» accompanies since 1995, the life of the French-speaking laboratories of Research, Development, Analysis and Control. «La Gazette du LABORATOIRE» is a meeting and exchange point, accessible to all the actors of the world of the Laboratory and Sciences.

SO: Opening Speeches

Room: MERLOT

8:30 AM WELCOME RECEPTION - REGISTRATION

9:15 AM
Opening speeches
Abdérafi CHARKI - University of Angers - FRANCE
QingPing Yang - Brunel University London - UNITED KINGDOM

10:00 AM
Citizen Metrology
Marc HIMBERT - LNE-LCM-CNAM - FRANCE

10:30 AM

Session chair: Marc HIMBERT - LNE-LCM-CNAM - FRANCE

11:00 AM
Towards Big Integration of Metrology, Quality and AI
QingPing Yang - Brunel University London - UNITED KINGDOM

11:30 AM
Metrology for Artificial Intelligence in Medicine
Hans RABUS - Physikalisch-Technische Bundesanstalt (PTB) - GERMANY

12:00 AM
Cooperative Intelligent Transportation Systems: Data, Safety and Security
Mohamed MOSBAH - University of Bordeaux - FRANCE

12:30 AM

S1. Plenary Session

Room: MERLOT

Session chair: Marc HIMBERT - LNE-LCM-CNAM - FRANCE

2:00 PM

Air conditioning reliability analysis based on dynamic Bayesian network and Markov model
Jiaqi XU, Qiang WANG, Chongjun YANG, Juan ZHOU, Linlin WU, Jiayan CHEN, Haiting ZHOU - China Jiliang University - CHINA

2:30 PM

Tipping point analysis of critical transitions in real-world complex systems
Valerie LIVINA - National Physical Laboratory - UNITED KINGDOM

3:00 PM

Thermometry in the digital era
Mohamed SADLI - LNE-LCM-CNAM - FRANCE

3:30 PM

Geometrical errors and their uncertainty in goniophotometers: an application to road surface photometry
Mikael LINDGREN - RISE - SWEDEN
Johana BERNASCONI, Peter BLATTNER - METAS - SWITZELAND
Dominique RENOUX - LNE - FRANCE - Paola LACOMUSSI - INRIM - ITALY

4:00 PM

4:30 PM

Hyperspectral imaging: some algorithms and pre-processors for industrial sorting applications
Mathieu MARMION - SPECIM - FINLAND

5:00 PM

A novel strategy to quantify the spatial resolution of X-ray tomograms featuring internal and external interfaces
Tetiana SOKOLTSOVA, Peter MOONEN - University of Pau - FRANCE
Romain BRAULT - CETIM - FRANCE

S2-1: Safety, reliability and quality

Room: Saint-Émilion

Session chair: Sylvain VERRON - University of Angers, France

9:00 AM

False signal minimization in PHM by augmenting the model with nonstructured information
Laurent DENIS - STATXPERT - FRANCE

9:30 AM

Heat sources failure instant estimation : comparison of Kalman smoothing and supervised learning
Sylvain VERRON, Mohamed Salim BIDOU, Laetitia PEREZ, Laurent AUTRIQUE - University of Angers - FRANCE

10:00 AM

Evaluation of supervised machine learning classifiers for fault detection in PV panels
Bassel CHOKR, Nizar CHATTI , Abdérafi CHARKI, Thierry LEMENAND - University of Angers - FRANCE
Mohamad HAMMOUD - Lebanese University - LEBANON

10:30 AM FORUMESURE EXHIBITION INAUGURATION

11:00 AM

Improving the metrological reliability of measuring instruments
Roald TAYMANOV, Roman TETERUK, Kseniia SAPOZHNIKOVA, Sergey MEDVEDEVSKIKH - D.I. Mendeleyev Institute for Metrology - RUSSIA

11:30 AM

Proposition for analysis of elastic deformation in ceramic tiles using Multilevel Factorial Design
Fernando Das Dores Silva - Department of Industrial Engineering, Federal University of São Carlos - BRAZIL

12:00 AM

Human factors and interfaces between operators, processes, and plants in the technical standards: the Italian experience
Romualdo MARRAZZO - ISPRAMBIENTE - ITALY
Domenico BARONE - TSI - ITALY

12:30 AM

S3: Data and applications in research and industry

Room: Graves

Session chair: Mamadou Kaba TRAORE - University of Bordeaux, France

9:00 AM

Handling measurement error at INRAE
Stéphane ANDANSON, Anne JAULIN, Amandine ETAYO - INRAE - FRANCE

9:20 AM

Open data, current and future challenges - Illustration by the opening of French public research data
Laurent BURNEL - INRAE - FRANCE

9:40 AM

Making research results from measurement systems more reliable with M³, INRAE's network of experts in the field of measurement, metrology and analysis methods. Towards a measurement management system
Anne JAULIN, Amandine ETAYO, Stéphane ANDANSON, Amélie TROUVE, Corinne BROSSE, Bénédicte CAMIER - INRAE - FRANCE

10:00 AM

The role of metrology in industry
Marc DAIDIE - DIMELCO - FRANCE

10:30 AM

11:00 AM

Data and Natural Language Processing: AI offers new sensors for tomorrow's predictive maintenance
Stéphane PUYDARRIEUX - Orano Fellow Expert, Applied Mathematics & Statistics - FRANCE
Céline ALBY - Axionable - FRANCE

11:30 AM

Feedback on COFRAC accreditation support for sampling and testing laboratories
Dominique PITON - Labo'CERT - FRANCE

12:00 AM

Process automation on mass comparators
Piotr BOBROWSKI - RADWAG - POLOGNE

12:30 AM

T1: Uncertainty evaluation

Room: Medoc
Schedule: 8:30 AM - 12:30 AM

Language:

Programme:

This tutorial allows you to get up to speed in order to be able to evaluate an uncertainty either from a modelable measurement process or from a data set from a non-modelable process.

The following points are covered during the tutorial:

- Statistical and mathematical reminders,
- Measurement process analysis,
- Uncertainty evaluation methods according to ISO 98-3 (GUM), ISO 5725,
- Simple exercices in calibration,
- Practical examples in testing,
- Use of uncertainty and declaration of conformity.

Tutorial animated by: Abdérafi Charki

Dr. **Abdérafi Charki** is a professor at POLYTECH Angers (an engineering school at the University of Angers) where he teaches mechanical engineering, quality engineering, risk management and metrology. He worked in the automotive industry and at COFRAC (French Accreditation Committee) before joining POLYTECH Angers in 2004. His research experiences include reliability, quality engineering, uncertainty evaluation, lifetime and life-cycle assessment of products and systems. He is also quality and metrology assessor for COFRAC.

10:30 AM

12:30 AM

T2: Data science, artifical intelligence and metrology

Room: Cabernet
Schedule: 8:30 AM - 12:30 AM

Language:

Programme:

The workshop proposed here is conducted especially in English and allows to share the expertise acquired in Data Science by the British reference laboratory National Physical Laboratory.

The tutorial will include the theoretical summary on:

- Overview of traditional uncertainty quantification in metrology: GUM and supplements,
- Uncertainty quantification for ML and AI in metrology,
- Comparison of conventional and AI-based time series analysis forecasting techniques,
- Tipping point analysis with applications in measurement data.

The second part of the tutorial will be the programming exercise on early warning signals with uncertainty, with software of users' choice.

Tutorial animated by: Valerie Livina

Dr. **Valerie Livina** is a principal scientist at National Physical Laboratory, which is the UK national measurement institute. Valerie is a data scientist specialising in time series analysis and application of ML/AI techniques. Her interests include analysis of geophysical datasets and instrumental sensor records in the area "Energy & Environment". Since 2007, Valerie has developed several novel techniques of tipping point analysis for early warning, detection and forecast of transitions and bifurcations of dynamical systems. Valerie leads European standardisation work on green and sustainable AI in the CEN JTC21 WG4. She has published more than 70 papers in international peer-reviewed journals, attended 130+ conferences and workshops (more than 30 as an invited speaker) and 170+ training and developmental courses. Valerie is a Chartered Mathematician and a Fellow of the Institute of Mathematics and its Application (CMath FIMA).

10:30 AM

12:30 AM

S2-2: Safety, reliability and quality

Room: Saint-Émilion

Session chair: Abdérafi CHARKI - University of Angers, France

12:30 AM

2:00 PM

Method for the control of blockchain exploitation
Mor DIOP, Yves DUCQ - University of Bordeaux - FRANCE
Said TAZI - University of Pau & Pays Adour - FRANCE

2:30 PM

Reliability test monitoring: detection of time-to-failure with specific instrumentation
Marco BONATO, Arnaud MAIRE - VALEO - FRANCE

3:00 PM

How TQM has impacted the industry
Mohammed ALOTAIBI - University of Strathckyde - UNITED KINGDOM

3:30 PM

Structure optimization design of gasket test rig based on response surface model
Quan WANG, Zhenyu ZHANG, Jiayan CHEN - China Jiliang University - CHINA
Lu WANG - Hefei General Machinery Research Insitute Co. - CHINA

4:00 PM

RD1 : METROLOGY IN AFRICA AND FUTURE CHALLENGES

Room: Saint-Émilion

Session chair: Marc HIMBERT - LNE-LCM-CNAM, France

4:30 PM

OPEN ROUND TABLE ON METROLOGY IN AFRICA

All people from Africa are invited to come to this round table in person or to connect remotely (Free access)

S4: Health and environment

Room: Medoc

Session chair: QingPing YANG - Brunel University London - UNITED KINGDOM

12:30 AM

2:00 PM

Accurate COVID-19 detection using full blood count data and machine learning

Richard YANG, QingPing YANG, Fang WANG - Brunel University London - UNITED KINGDOM
Ding CHEN, Yang QIU - Wuhan Union Hospital affiliated with Tongji Medical College - CHINA

2:30 PM

Forecasting the age and gender of arriving asylum seekers: A case study of the south Sudan crisis

Alireza JAHANI, Derek GROEN, Diana SULEIMENOVA - Brunel University London - UNITED KINGDOM

3:00 PM

An ontology-based epidemic hospital model extraction

Zhen DANG, QingPing YANG, Tao ZHANG - Brunel University London, UNITED KINGDOM

3:30 PM

Weighted least squares algorithm based on remote water representation value error curves

Shun ZHANG, Shengwei ZHOU, Zhibo CEN,
Juan ZHOU - China Jiliang University & Ningbo Metrology and Testing Institute - CHINA

4:00 PM

4:30 PM

A smart solution to plant growth monitoring and control in greenhouses: methodology and instrumentation

Radhwen BEN KAHLA - ESPRIT - TUNISIA
Imen HARBAOUI, Feiza GHEZAIL - INSAT - TUNISIA

5:00 PM

Monitoring and detection of toothbrushing with smart watches and artificial intelligence

Eduardo CASILARI, Francisco J. GONZALEZ-CANETE - University of Malaga - SPAIN

5:30 PM

Measurement uncertainty evaluation for the mechanical properties of plastics piping systems undergoing bending tests

Anthony BATHIAS - IDETEC Environment - FRANCE
Abdérafi CHARKI - University of Angers - FRANCE

S5: Manufacturing and engineering

Room: Graves

Session Chair: Valerie LIVINA - National Physical Laboratory, United Kingdom

12:30 AM

2:00 PM
A virtual CMM to estimate uncertainties
Jean-François MANLAY - CEA/DAM - FRANCE

2:30 PM
Robotic path planning using NDT ultrasonic data for autonomous inspection
Mengyuan ZHANG, QingPing YANG - Brunel University London - UNITED KINGDOM
Mark SUTCLIFFE, David CARSWELL - TWI Technology Centre- UNITED KINGDOM

3:00 PM
The evaluation of calibration interval for equipment devices using small-shift sensitive control charts
Hussain ALSALAMAH, Sadek AMR - SASO - KINGDOM OF SAUDI ARABIA

3:30 PM
A 3D modelling pipeline based on fringe projection profilometry
Tao ZHANG, QingPing YANG - Brunel University London - UNITED KINGDOM

4:00 PM

4:30 PM
Enhancing collaboration through centralised terminology resources
Michael CHRUBASIK, Chris T. S. LORCH, João GREGORIO, Paul M. DUNCAN - National Physical Laboratory - UNITED KINGDOM

5:00 PM
Optimization of magnetic tunnel junction platforms in magnetic-based positioning systems for applications in remote sensing of displacements in closed-loop MEMS circuits
Artem TALANTSEV, Elvira PAZ, Tim BOEHNERT, Ricardo FERREIRA - INL - PORTUGAL

5:30 PM
Measurement uncertainty evaluation of coordinate measuring machines using web application and ontology
Priyanka BHARTI, QingPing YANG - Brunel University London - UNITED KINGDOM

T3: Use of open data

Room: Cabernet

Schedule: 2:00 PM - 6:00 PM

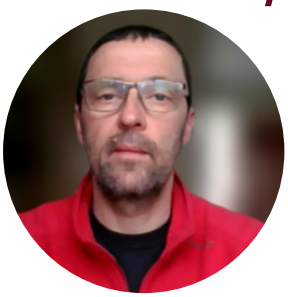
Language:

Programme:

In research and development, the issue of data control is commonly addressed from the perspective of the data life cycle which has an impact on the quality of data. The data life cycle has to be managed in according with good practices. The aim of this tutorial is to give confidence in the sharing and re-use of data, whether you are a producer or re-user.

This practical and interactive workshop will enable participants to understand the actions to be taken during the the different stages of the data lifecycle, from creation and reliability to publication and reuse.

Tutorial animated by: Laurent Burnel & Anne Jaulin



Laurent Burnel is an engineer in charge of data quality in a public research department at the National Research Institute for Agriculture, Food and Environment (INRAE - FRANCE). His mission is to accompany the department's teams towards good research practices in the transition to open science. Laurent's role is part of a movement initiated at the European level to promote access and reuse of research products, including data produced by scientists.

Anne Jaulin is an engineer at INRAE France, National French Research Institute for Agriculture, Food and Environment. Trained as a chemist, Anne was for 20 years in charge of a laboratory in a research unit dealing with soil ecotoxicology. She has acquired expertise in physicochemical analysis of contaminants in complex environmental and biological matrices, in validation of analytical methods and chemometrics, as well as in quality management on different ISO standards. In 2015, Anne participated in the development of CheMOOCs, a MOOC specialized in chemometrics. In 2019, Anne joined INRAE's DIAGONAL steering support department, to implement the institute's quality policy, particularly on the aspects of data reliability from measurement systems, a fundamental condition in the perspective of open science. Currently, Anne Jaulin is in charge of the management and deployment of the M³ INRAE network, a transversal network of experts in the field of Measurement, Metrology and Method validation. Anne has recently joined the board of directors of CAFMET and CN X07B Metrology of AFNOR, French Organization for Standardization.

4:00 PM

Characterization of the Algerian natural gas for the development of the national economy
Hanine HADFANI, Nafissa KHENNAFI-BENGHALEM, Amira DIAFAT - ALGERIA

The degree of status for executing DDMRP in Moroccan Aerospace firms
Soumaya IDRISSI JAZOULI, Mohamed BEN ALI, Otmane BOUKSOUR, Said RIFAI - ESTC High School of Technology and ENSEM School of Engineering, Uniersity Hassa II of Casablanca - MOROCCO

Conducting polymer/graphene oxide nanocomposites as electrodes for electrochemical sensing
Ahmed ABOU-KANDIL, Yackout S, Ibrahim SH, Saleh B, Awad A - National Institute of Standards - EGYPT

A proposed method using t-test for stability check in proficiency testing in tensile and hardness tests of materials - Riham HEGAZY - National Institute of Standards - EGYPT

The establishment of a management system according to OHSAS 18001 v 2007
Rachid BOUIMINDI - Ministry of Industry and Trade of Morocco - MOROCCO

Sentiment analysis of public opinion in social media using SVM
Jing LIU, Yanmeng XU, Nadarajah MANIVANNAN, Frederico COLECCHIA - Brunel University London - UNITED KINGDOM

Modeling and reverse engineering using the ICP method. Application to the gas turbine blade
Benattia BLOUL, Benaumour AOUR, Helene CHANAL - University of Boumerdes - ALGERIA

Determination of uncertainties using the ISO 11352 V 2012 standard
Zahia LAMALI - Water and sanitation company of Algiers - ALGERIA

Some practical considerations concerning metrological traceability established through the 3b route in mass calibrations - Adriana VALCU - Romanian Accreditation Association - ROMANIA
Adela CALIN - Europe Qualite România - ROMANIA

Impact of supply chain risk management on supply chain performance and sustainability: case study of Moroccan petroleum industry - Sara SARIR, Mohamed EL OUMAMI, Zitouni BEIDOURI - Hassan II, University of Casablanca-MOROCCO

Contribution to the maintenance of bearings and study of their lubrification system
Mounia TALEB, Sihem GOUDELBOURK, Abdelkrim RECHACH - Larbi Tebessi University - ALGERIA

Neural network approach for the prediction of the indoor temperature of buildings in hot climates
Hanene LOUIHICHI, Ben Aissia HABIB - National School of Engineering of Monastir - TUNISIA
Jacques JAY - INSA of Lyon - CETHIL, FRANCE

Promoting a sustainable diffusion of solar PV electricity in Africa: results of the leopard project
Ababacar NDIAYE, Cheikh M.F KEBE, Pape Alioune DIA, Vincent SAMBOU - ESP-UCAD - SENEGAL

Velocity smart measurement of froth flotation systems with machine vision
Ahmed BENDAOUIA, El Hassan ABDELWAHED - Cadi Ayyad University - MOROCCO

Implementation of the FMEA process according to the new manual VDA-AIAG
Charaf Eddine RIDHI - Cadi Ayyad University - MOROCCO

A process quality diagnosis method based on new Bayesian network model
Jianqi YANG, Qiyong ZENG - China Jiliang University - CHINA

Predict of the consumption of electricity in the residential sector using Artificial Neural Network
Leila LOUHICHI, Saloua BENAMMOU - Faculty of Economic Sciences and Management os Sousse - TUNISIA

Feedback for data management, sharing and reuse in a research laboratory
Valérie MOLINERO-DEMILLY, Sandra PELLETIER, Eric MONTAUDON, Jérôme VREDIER, Julien JEAUFFRE - University of Angers, INRAE - FRANCE

Automatiue defects detection in process injection molding by using deep learning and computer vision
Mohamed EL GHADOUI - ENSEM Casablanca - MOROCCO

Creation of the MOOC «Quality in Research»
Amandine ETAYO - INRAE - FRANCE

Track maintenance decision support tool for a Swedish heavy haul railway line
Adithya THADURI, Mahdi KHOSRAVI, Alireza AHMADI, Matti RANTATALO - Lulea University of Technology - SWEDEN

Quality and metrology in wood science higher education from improving skills to better use of forest resources - Marie-France THEVENON, Hanane ASSOUFI, Hafida EL HAOUZALI, Abdellatif ZERIZER, Djamel ALIOUCHE, Gilles CALCHERA - CIRAD - FRANCE
Luc MARTIN - QMP Management - Marocco

Risk analysis assessment in working testing and calibration laboratories in accordance with ISO/IEC 17025: 2017 standard
Serap KOKTAS KOCA, Salih AYVAZ, Zeynep Naz AYVAZ, Funda ARSLAN - National Accreditation Center, UNITED STATES OF AMERICA

S6: Industry 4.0 and future industry

Room: Saint-Émilion

Chairman: Yves DUCQ - University of Bordeaux - FRANCE

9:00 AM

Blockchain-based IOT for Industry 4.0 : Exploring opportunities and applications
Dorcas Dachollom DATIRI, Maozhen LI - Brunel University London - UNITED KINGDOM

9:30 AM

The use of quality tools, concepts and methods to help the transition to Industry 4.0: On the way to Quality 4.0
Marie-Hélène GENTIL, Catherine MERLE - University of Bordeaux - FRANCE

10:00 AM

Machine learning for combined predictive strategies in an industrial 4.0 context: a systematic literature review
Jihen ISSAOUI, Nadia BAHRIA - ENIT - TUNISIA
Imen HARBAOUI - INSAT - TUNISIA

10:30 AM

11:00 AM

Integration of Industry 4.0 services and features in the banking sector: Overview and feasibility
Samar AOUN, Yves DUCQ - University of Bordeaux - FRANCE
Roy ABI ZEID SAOU - MART Learning - LEBANON

11:30 AM

New approaches to training metrologists in the transition to Industry 5.0
Roald TAYMANOV, Kseniia SAPOZHNIKOVA, Alexey IGNATKOVICH - D.I. Mendeleyev Institute for Metrology - RUSSIA

12:00 AM

From prediction to measurement, an efficient method for digital human model obtainment
Moyu WANG, QingPing YANG - Brunel University London - UNITED KINGDOM

12:30 AM

T4: Data analysis

Room: Graves
Schedule: 8:30 AM - 12:30 AM

Language:

Programme:

In the field of measurement as in that of quality engineering, descriptive statistics are often overlooked in favor of more advanced statistics, inferential or predictive. Unfortunately, a poor knowledge of the structure of the data may lead to biased use or even distorted inferential or predictive statistics.
During this tutorial, you will learn how to use R and RStudio to perform simple descriptive statistical analyses, and also to automate the creation of a report with RMarkdown. R remains a language of open-source programming created by and for statisticians.
The tutorial will also include the following items:

- Creating an R project in RStudio,
- Creation of a repeatable and reusable file,
- Descriptive analyses:
    * What is it?
    * Why make them?
    * How to make them?
    * Univariate ?
    * Bivariate ?

Tutorial animated by: Marie Vaugoyeau

Marie Vaugoyeau, PhD in ecology and evolutionary biology, is a freelance mentor for people who want to learn how to analyze their data. As a freelance data scientist, she also works with companies to enhance their data and improve their coding best practices. After a degree in agricultural engineering and five years in public research in ecology, Marie opened up to the world of corporate data, first as an employee and now as a freelancer. Writer of a statistics blog and R, creator of live broadcasts on Twitch, she has been using R for over 10 years.

10:30 AM

12:30 AM

T5: Metrology assessment in a laboratory

Room: Medoc

Schedule: 8:30 AM - 12:30 AM

Language:

Programme:

This workshop allows laboratory personnel to learn how to perform a metrology audit taking into account ISO/IEC 17025, ISO 15189, ISO 10012, GEN REF 10, etc.
Metrology auditing requires specific skills, not only organizational skills but also technical skills (e.g. knowing how to estimate an uncertainty, etc.).

The following points will be developed:

- Presentation of the main standards related to metrology,
- Essential principles for a successul metrology audit,
- Important steps to remember during a metrology audit,
- Technical data mining and feedback,
- Reminder on uncertainty estimation methods,
- Observation of live audit sequences,
- Writing of audit findings related to metrology and metrology audit report.

Tutorial animated by: Abdérafi Charki

Dr. **Abdérafi Charki** is a professor at POLYTECH Angers (an engineering school at the University of Angers) where he teaches mechanical engineering, quality engineering, risk management and metrology. He worked in the automotive industry and at COFRAC (French Accreditation Committee) before joining POLYTECH Angers in 2004. His research experiences include reliability, quality engineering, uncertainty evaluation, lifetime and life-cycle assessment of products and systems. He is also quality and metrology assessor for COFRAC.

10:30 AM

12:30 AM

T6-1, T6-2: Optimization for maintaining complex systems in operational conditions

Room: Cabernet

Schedule: 8:30 AM - 12:30 AM (T6-1) and 2:00 PM - 6:00 PM (T6-2)

Language: 8:30 AM - 12:30 AM 2:00 PM - 6:00 PM

Programme:

This tutorial allows to understand the advanced aspects related to reliability, availability and maintenance of a complex system, and to use all measured data to be able to evaluate the performance of a system and to monitor it in operating conditions.
The following points will be developed:

- Modelling of a simple repaired system,
- Integration of complex case studies,
- Extension to the safety study,
- System repaired at element, subsystem failure,
- Redundant system repaired on inspection,
- Redundant system with common failure modes,
- Time-varying constrained system,
- System under constraints depending on the state of the subsystems.

Tutorial animated by: Laurent Denis

Laurent Denis is the founder and General Manager of StatXpert, a 18 year-old company dedicated in servicing numerous industries in Reliability Engineering in all of its facets. StatXpert accompanies many companies, from Design to Customer support, to help set up optimized strategies at the highest level warrantying a safe development, manufacturing and follow-up of high-reliability systems along all their operational lives.

Mr. Denis holds a MBA, a Master's degree in Statistics & Operational Research and was post-graduated in Big Data-oriented statistics for Engineers.

10:30 AM

12:30 AM

S7: Energy and built environment

Room: Saint-Émilion

Session Chair: Thierry LEMENAND - University of Angers - FRANCE

12:30 AM

2:00 PM

Detecting night opening of windows in summer: a case study.
Valentin HOYET, Marie-Lise PANNIER - University of Angers - FRANCE
Maxime ROBILLART, Mathieu BOUVILLE - Kocliko - FRANCE

2:30 PM

Assessment methodology of long-term measurement data in the field of building energy performance
Yousra LAAROUSSI, Ugo DE FILIP, Lilia GALAI DOL, Olivier GRESLOU, Rofaida LAHRECH - CSTB MLV - FRANCE

3:00 PM

Computationally efficient sensitivity analysis for building ecodesign with many-level categorical input factors
Marie-Lise PANNIER - University of Angers - FRANCE
Patrick SCHALBART, Bruno PEUPORTIER - Mines ParisTech - FRANCE

3:30 PM

Assessing the knowledge and compliance of quality management practice among Ghanaian construction organisations
Hilary OSEI-BONSU, Nuhu BRAIMAH, Muhammas SHAFIQUE - Brunel University London - UNITED KINGDOM

4:00 PM

4:30 PM

Analysis of Research Trend and Detection Technology of Hydrogen Damage in Metallic Materials
Chenxi ZHU, Haiting ZHOU - China Jiliang University - CHINA
Dongdong YE - Anbui Polytecnic University - CHINA
Muda JIN - Zheijiang Academy of Special Equipment Science - CHINA

5:00 PM

Power consumption estimation of love wave sensors using Ltspice
Marlo ANDRADE SANTOS, Marcelo VIANA SILVA, Ewaldo E. C. SANTANA, Raimundo C. S. FREIRE- University of Maranhao State - BRAZIL - Ollivier TAMARIN, Corinne DEJOUS - University of Bordeaux & Guyane - FRANCE

5:30 PM

Data fusion for uncertainty evaluation in extreme electrical metrology
Marija CUNDEVA-BLAJER - Ss. Cyril and Methodius University in Skopje, Faculty of Electrical Engineering and Information Technologies - NORTH MACEDONIA

T7: Measurement management in accordance with ISO 10012

Room: Graves
Schedule: 2:00 PM - 6:00 PM

Language:

Programme:

This tutorial allows to come back on the important elements of the ISO 10012 standard concerning the management of the measurement.

The following items are covered:

- Presentation and interpretation of the requirements of the ISO 10012 standard,
- Management of measurement equipments, follow-up and monitoring,
- Calibration and verification of a measuring device in-house,
- Setting up the metrology function in a company,
- Future evolution of the ISO 10012 standard.

Tutorial animated by: Grégory Charpentier

Grégory Charpentier has held various positions within the design office, methods and industrialization and then as head of the metrological service in an entity of a large French company specializing in the manufacture of high-performance transparencies for aeronautics and shipbuilding, the rail and armoured vehicles. Passionate about organizations, Grégory was trained by François Dupuy in the sociology of organizations, knowledge that he has been able to apply throughout his career and in his management functions Group quality at one of the world leaders in aircraft maintenance tools or more recently in as Quality and Technical Director at a leader in the intellectual services delivery segment. Holder of numerous certifications such as Lead-auditor IRCA-9001, AATT EN9100, LEAN 6 Sigma, WCM and member of the ISO standards commission, Grégory founded in May 2021 the company QALIA with which he developed a unique know-how combining the expertise of the company's management systems advocated by normative references with the sociological analysis of organizations.

4:00 PM

RD2: FUTURE INDUSTRY: NEW SKILL REQUIREMENTS FOR QUALITY AND METROLOGY

Room: Medoc

Session Chair: Luc MARTIN - QMP Management - Morocco

2:00 PM

OPEN ROUND TABLE ON THE INDUSTRY OF THE FUTURE

All people from Africa are invited to come to this round table in person or to connect remotely (Free access)

4:00 PM

CAFMET GENERAL ASSEMBLY

Room: Medoc

Session Chair: Abdérafi CHARKI - University of Angers - FRANCE

4:30 PM

AWARDS and CLOSING CEREMONY

Room: Saint-Émilion

Session Chair: QingPing YANG - Brunel University London - UNITED KINGDOM

5:45 PM

Gala Dinner

June 6th 7 PM 2023

Departure from the Hilton Garden Inn at 7:30 PM

Confirm before May 30th, 2023

The number of places is limited. Please confirm your participation as soon as possible at: contact@mq-datascience.com

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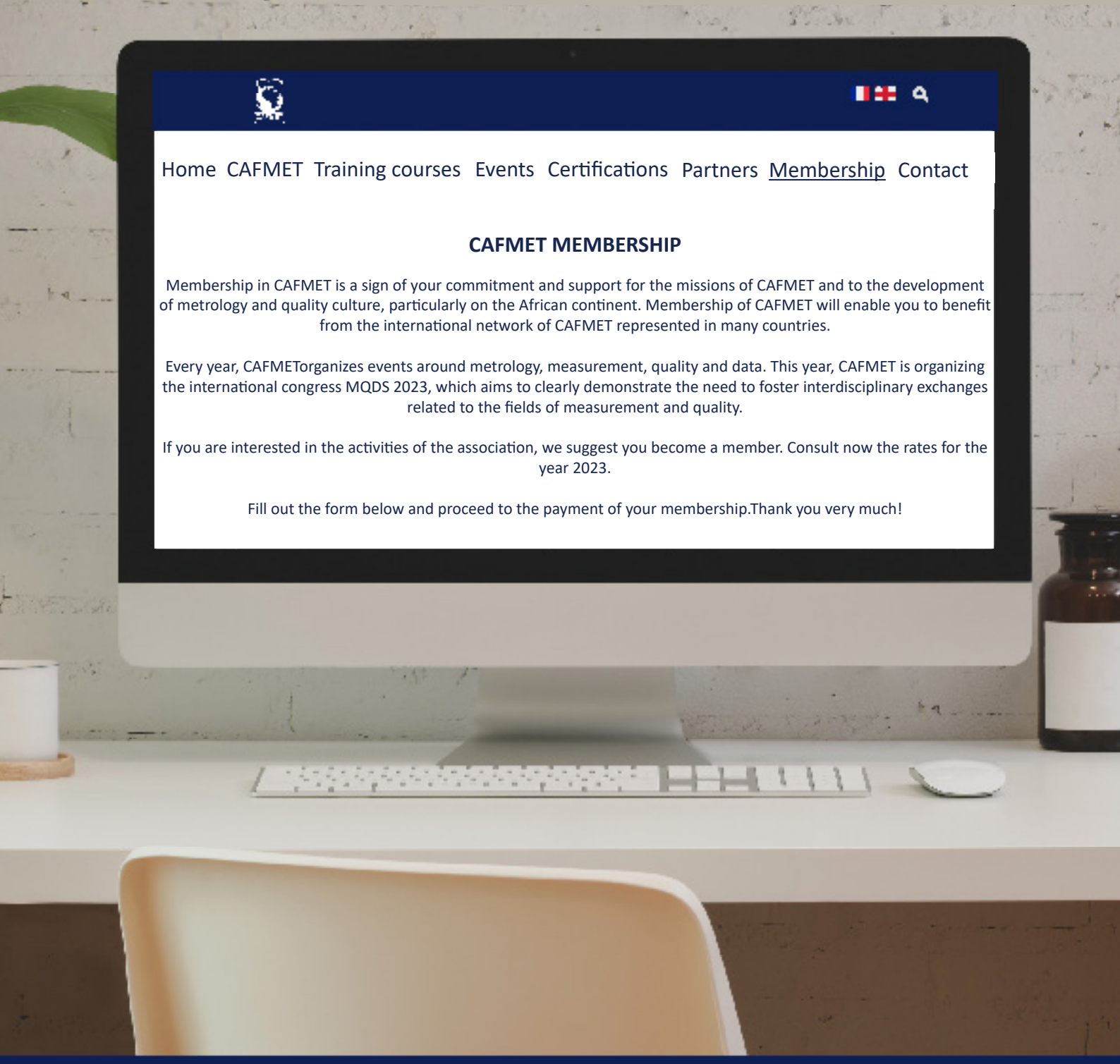

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What is CAFMET?

CAFMET is an international non-profit organization based in Angers (France). Since 2005, CAFMET sensibilize companies (public or private) on the importance of quality and metrology for the sustainable development of a country.

CAFMET's missions:

- **TO DISSEMINATE** metrological culture specially in Africa by organizing conferences, tutorials, exhibitions, etc. to allow a positive exchange between members and bodies (laboratories, industries, universities, etc.)
- **TO SUPPORT** bodies in the development of technical and quality systems
- **TO FOSTER** the participation of experts in technical groups of international organizations and standardization committees
- **TO DEVELOP** technical skills in metrology, quality and data science

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