EURAMET Autumn School: Increasing the trustworthiness of sensors for environmental applications through metrology

19-23 October 2026, METAS (Bern, CH)

Day 1, Monday 19 October 2026

Time (CET)	Topic	Lecturer
08:30 – 09:00	Registration	METAS
09:00 – 09:15	Welcome and opening	M. Iturrate-G./P. Blattner (METAS)
09:15 – 09:30	EURAMET – European Association of National Metrology Institutes	H. Andres (METAS)
09:30 – 09:45	CaBuCo – EURAMET Capacity Building Coordination project	P. Kiska (CMI)
09:45 – 09:55	European Metrology Network (EMN) for Pollution Monitoring (POLMO)	N. Guigues (LNE)
09:55 – 10:05	EMN for Climate and Ocean Observation (COO)	C. Pascale (METAS)
10:05 – 10:15	EMN for Mathematics and Statistics (Mathmet)	F. Pennecchi (INRIM)
10:15 – 10:30	Practical information	M. Iturrate-G. (METAS)
10:30 – 11:00	Overview on sensors and sensor vocabulary	M. Iturrate-G. (METAS)
11:00 – 11:25	Coffee break	
11:25 – 13:15	Measuring principles of sensors for: - gas pollutants - airborne particulate matter (PM) - water quality - light pollution - noise pollution	V. Ferracci (NPL) U. Trivanovic (METAS) C. Borges (IH)/N. Guigues (LNE) C. Bouroussis (METAS) J. Khan (AU)
13:15 – 14:00	Lunch	
14:00 – 14:30	Performance characteristics: which ones for which applications?	N. Guigues (LNE) All lecturers and participants
14:30 – 15:00	What aspects should be considered to select a sensor/device fit for purpose?	N. Guigues (LNE) All lecturers and participants
15:00 – 15:20	Selecting a sensor/device: example of a selection process in water quality	N. Guigues (LNE)
15:20 – 15:30	Instruction for practical exercise in different applications	N. Guigues (LNE)
15:30 – 16:00	Coffee break	
16:00 – 16:45	Exercise in groups to cover the selection process in different environmental cases	All lecturers and participants
16:45 – 17:30	Presentation by each group followed by an interactive discussion	N. Guigues All participants

Optional: Social dinner

Day 2, Tuesday 20 October 2026

Time	Topic	Lecturer
09:00 – 09:15	Wrap up from day 1	M. Iturrate-G. (METAS)
09:15 – 10:40	Calibration of sensors: best practices - gas sensors - airborne PM sensors - water quality sensors - light sensors - noise sensors	V. Ferracci (NPL) U. Trivanovic (METAS) C. Borges (IH)/T. Naÿkki (SYKE) C. Bouroussis (METAS) J. Khan (AU)/D. Rodrigues (LNE)
10:40 – 11:00	Coffee break	
11:00 – 12:15	Overview on available standardisation and guidance documents for sensor performance assessment under controlled conditions	N. Guigues (LNE) All participants
12:15 – 12:45	How we can include matrix effects on sensor response?	N. Guigues (LNE) All participants
12:45 – 13:30	Lunch	
13:30 – 15:00	Protocols for validation of sensor performance assessed under controlled conditions in real applications – Requirements, best practices and examples for: - gas sensors - water quality sensors - light sensors - noise sensors - airborne bioaerosol monitoring	V. Ferracci (NPL) N. Guigues (LNE)/T. Naÿkki (SYKE) C. Bouroussis (METAS) J. Khan (AU)/D. Rodrigues (LNE) K. Vasilatou (METAS)
15:00 – 15:30	Coffee break	
15:30 – 16:30	Fundamentals of sensor networks: from design to risk assessment	M. Koval (CMI)
16:30 – 17:30	Calibration of sensor networks: the road to traceability	S. Tabandeh (VTT)

Day 3, Wednesday 21 October 2026

Time	Topic	Lecturer
09:00 – 09:15	Wrap up from day 2	N. Guigues (LNE)
09:15 – 10:15	Case studies on sensor nodes: from selection to deployment – sensor qualification, installation, operation, maintenance and quality assessment and control	N. Guigues (LNE) C. Borges (IH) TBC
10:15 – 10:25	Deployment, installation and representativeness of sensors and sensor networks	M. Koval (CMI) All lecturers and participants
10:25 – 10:50	Coffee break	
10:50 – 12:45	Deployment, installation & representativeness of sensors and sensor networks	All lecturers and participants
12:45 – 13:30	Lunch	
13:30 – 15:30	Life cycle of sensors and sensor networks: calibration, maintenance, risk assessment and quality controls – ensuring reliability in the long run	S. Tabandeh (VTT) All lecturers and participants
15:30 – 15:50	Coffee break	
15:50 – 17:30	Low-cost sensor kits for citizen science – A hands-on exercise of collocation	M. Iturrate-G. (METAS) All participants

Day 4, Thursday 22 October 2026

Time	Topic	Lecturer
09:00 – 09:15	Wrap up from day 3	N. Guigues (LNE)
09:15 – 10:30	Data processing: why and how? How can AI help optimise data processing?	N. Mischler (METAS)
10:30 – 10:50	Coffee break	
10:50 – 12:15	Uncertainty estimation in real operating conditions Principle of measurement uncertainty estimation with 1-2 examples from real applications	N. Mischler (METAS)
12:15 – 13:00	Overview on machine learning (ML) algorithms for sensor calibration and drift detection	E. Borisova (METAS)
13:00 – 13:45	Lunch	
13:45 – 15:15	Practical exercises on machine learning – from sensor data exploration to simple calibration algorithms	E. Borisova (METAS) H. Sarwar (UH) J. Khan (UA) All participants
15:15 – 15:40	Coffee break	
15:40 – 17:00	Practical exercises on machine learning – complex calibration algorithm and performance assessment of calibration models	E. Borisova (METAS) H. Sarwar (UH) J. Khan (UA) All participants
17:00 – 17:30	Presentation of results from practical exercises	E. Borisova (METAS) All participants

Day 5, Friday 23 October 2026

Time	Topic	Lecturer
09:00 – 09:15	Wrap up from day 4	M. Iturrate-G. (METAS)
09:15 – 11:15	Hands-on: low-cost sensor measurements and data	M. Iturrate-G. (METAS) E. Borisova (METAS) N. Mischler (METAS) All participants
11:15 – 11:30	Coffee break	
11:30 – 13:15	Laboratory visits: - Calibration test bench for particles sensors - Water quality sensor network - Radon lab, X-ray lab - Calibration test bench for noise - Optics lab, roof facility for light pollution monitoring	K. Vasilatou/U. Trivanovic (METAS) M. Burri (METAS) P. Peier (METAS) TBC C. Bouroussis (METAS)
13:15 – 14:00	Lunch	
14:00 – 15:00	Quiz Feedback from participants Wrap up and conclusion	N. Guigues (LNE) M. Iturrate-G. (METAS) All participants