

NANOSCALE 2023 AT A GLANCE



Venue: **Technopolis Ruoholahti, Address: Hiilikatu 3, 00180 Helsinki, Finland**

Version 2.0 of 2023-09-29 (page numbers added, contributions F-4 ↔ P-62 swapped)

Finnish time is East European Summer Time (eest)! This list is intended as a quick&easy overview only. For the details incl. all co-authors, their affiliations, exact times of all talks, coffee-breaks and other information, please see the detailed Session Programme and List of Posters in the Book of Abstracts (page numbers as reference).

The **first page number** is for the **printed** Book of Abstracts, the **second** for the digital Book of Abstracts (available as download from early October on)

Tuesday, 11:00-13:00

CHECK-IN

3/2

Handout of Book of Abstracts and name badges. Poster boards ready for the posters, please place your poster there.
*Please note: **No lunch served at NanoScale on Tuesday.** We recommend to have an early lunch in town or on your way to NanoScale; there is also a restaurant on the Technopolis Ruoholahti campus (lounas/lunch buffet for 12,70 €), next door to NanoScale! Delegates of TC-L and consortium members of TracOptic will have an early lunch in Espoo directly after the closure of their meetings and will then be brought to NanoScale by shuttle bus. Information will be given at the TC-L/TracOptic meetings.*

Tuesday, 13:00-13:15

OPENING & WELCOME

M. Heinonen
Virpi, Thorsten

Welcome by the Vice-President of VTT MIKES
Opening Remarks

Tuesday, 13:15-14:35

1st Session – Crystalline calibration standards – chaired by Alexandra Delvallée

13/11

A-1	I. Busch	New ways to calibrate microscopes at nanoscale: How the Silicon lattice parameter is used for new type calibration artefacts	13/11
A-2	M. A. Lawn	Step height measurement of monoatomic silicon crystal lattice steps with a commercial Atomic Force Microscope	15/13
A-3	L. Daul	New UHV facility for series production of low-cost crystalline standards	17/15
A-4	Yushu Shi	Evaluation of the influence of magnification variation on the silicon lattice spacing measurement in high-resolution TEM	19/17

Tuesday, 15:00-16:40

POSTER SESSION A – please see list of posters at the end of this “NanoScale 2023 at a glance”

Tuesday, 16:40-18:00

2nd Session – MetExSPM Session I – chaired by Antti Lassila

25/21

B-1	V. Korpelainen	MetExSPM (EMPIR-project 20IND08): Development of traceable methods for high speed and large range SPM	25/21
B-2	T. Gotszalk	Application of active piezoresistive cantilevers in high-eigenmode surface imaging	27/23
B-3	J. Thiesler	A high speed large-range SPM scanner based on a hybrid combination of a magnetic levitation stage and piezo scanners	29/25
B-4	P. Klapetek	Data processing in metrological high-speed Scanning Probe Microscopes	31/27

Tuesday, 18:15-20:00

WELCOME RECEPTION (included for all NanoScale participants)

Wednesday, 09:00-10:20	3rd Session – AI methods for nanometrology – chaired by Petr Klapetek	33/28
C-1 J. Jin / J. Lee	Deep-learning based thickness and refractive index measurement of a thin-film layer	33/28
C-2 M. Ritter	Accuracy aspects of focused ion beam tomography data reconstruction	35/30
C-3 Z. Akbarian	AFM calibration at the nanoscale using DNA origami pitch standards and artificial-intelligence-based data refinement	37/32
C-4 A. Mattila	Artificial Neural Network-Assisted Spectral Scatterometry for Grating Quality Control	39/34
Wednesday, 10:50-12:20	4th Session – TracOptic Session – Open and free TracOptic Stakeholder Meeting (hybrid) – chaired by Uwe Brand	43/36
D-1 U. Neuschaefer-Rube	The TracOptic-Project – An Overview	43/36
D-2 V. Heikkinen	Exemplary instrument characterization (WP 1)	45/38
D-3 S. Gao	Systematic performance deviations of optical surface topography measuring instruments (WP 2)	47/40
D-4 H. Hooshmand	Scattering methods for modelling optical surface topography measurement instruments (WP 3)	49/42
D-5 M. Zucco	Selection of appropriate instrumentation and procedures for data evaluation and uncertainty estimation (WP 4)	53/46
Wednesday, 12:20-13:20	LUNCH (included for all NanoScale participants)	
Wednesday, 13:20-13:45	Overview presentation – chaired by Marco Pisani	57/49
E-0 H. Bosse	European Metrology Network (EMN) for Advanced Manufacturing – Focus on nanometrology	57/49
Wednesday, 13:50-14:50	5th Session – Simulation and modelling – chaired by Bakir Babic	61/52
E-1 D. Linnert	Simulative prediction of work-piece influences on chromatic confocal distance measurements	61/52
E-2 E. Oertel	Modelling the measurement process for the radius and roundness measurement of micro spheres	65/55
E-3 Min Xu	Validation of data evaluation algorithm for the calibration of 3D standards using an AFM simulator	69/58
Wednesday, 15:10-17:00	POSTER SESSION B – please see list of posters at the end of this “NanoScale at a glance”	
Wednesday, 17:00-18:20	6th Session – SPM methods – chaired by Teodor Gotszalk	73/61
F-1 S. de Prévaille	A robust, high-throughput scanning microwave microscope	73/61
F-2 F. Piquemal	Calibrating Resistance Measurements in Conductive Probe AFM: development of 1 st universal standard sample	77/64
F-3 B. Babic	Immersive visualisation for metrological Scanning Probe Microscopy data sets	79/66
P-62 ↔ F-4 D. Richet	A num. environment for evalu. robustness of Short Open Load calibration for capac. measm'ts in Scann. Microwave...	243/185
Wednesday, 19:00-21:00	CONFERENCE DINNER (included for all NanoScale participants who had registered for the dinner)	

Thursday, 09:00-10:00	7th Session – MetExSPM Session II – chaired by Andrew Yacoot	87/71
G-1 E. Heaps	Application of nanometrology to improve nanopositioning stages with applications in High-Speed AFM	87/71
G-2 G. Dai	Progress on traceable surface & nanometrology: 2 nd nanomeasuring & nanopositioning machine (NMM) at PTB	91/74
G-3 T. Gotszalk	Surface measurements using Omega type active piezoresistive SPM cantilevers	95/77
Thursday, 10:30-11:30	8th Session – SEM and interferometry – chaired by Christian Kottler	99/80
H-1 T. Klein	Refined image analysis and simulation for traceable size measurement of nanoparticles over a wide size range using TSEM	99/80
H-2 M. Aketagawa	New demodulation method without low-pass filters for sinusoidal phase modulation interferometer	103/83
H-3 M. Pisani	Interferometers at the nanoscale for space applications	107/87
Thursday, 11:30-12:00	DISCUSSION, ARRANGEMENT OF LAB TOURS – CLOSURE	
Thursday, 12:00-13:00	LUNCH (included for all NanoScale participants)	
Thursday, 13:00-17:00	LAB TOURS AT VTT MIKES IN ESPOO – please have ID card/passport ready and allow ample time for the lab visits! Transfer from NanoScale directly to VTT MIKES by chartered shuttle bus. Return in the evening on individual basis, e. g. by Metro.	

POSTERS

Please keep your posters on the posterboards throughout the conference so that they can be visited also in all coffee breaks. **109/ 88**

POSTERS – PART 1	INTERFEROMETRY	111/ 89
P-11 A. Bridges	Correction of periodic non-linearities in homodyne optical interferometry by meas't arm intensity normalization	115/ 91
P-12 A. Yacoot	Generation and measurement of sub nanoradian angles	119/ 94
P-13 E. Heaps	Characterisation of a novel multi-axis position sensor	123/ 97
P-14 D. Leitz	Compensation method of measm't deviation by the lateral positioning axis for topo. Meas,'ts with heterodyne interferom...	127/100
P-15 V. Shmagun	Periodic nonlinearities of the fiber interferometric sensor in comparison to commercial homodyne interferometer	133/105
P-16 M. Hola / S. Rerucha	Modified common-path differential interferometer with balanced arms and sub-nanometre long-term zero drifts	137/108
P-17 S. Rerucha	Characterising and tackling thermally induced zero-drift in displacement measuring interferometry	139/109
P-18 Khaled M. Ahmed	Gauge block interferometer designed for gauge blocks calibration with modified uncertainty budget	143/112

POSTERS – PART 2	SCATTEROMETRY and ELLIPSOMETRY	147/115
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P-22 Anubhav Paul	Exploring Impact of Steep Side Wall Angles on Nanostructure Far Fields using Coherent Fourier Scatterometry: Simu/Exp...	153/119
P-23 S. Bösche	Analysis of fine milled technical surfaces with angular resolved scatterometry	155/120
P-24 J. Grundmann / B. Bodermann	Adaptions of a conventional imaging ellipsometer for the full Mueller matrix	159/123
P-25 T. Käseberg	Resonance enhanced optical nanometrology	161/125
P-26 J. Krüger	Enhancement of an on-going photomask CD-comparison by a new approach for model-based optical measurements	165/128
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P-30 S. Gao	EURAMET comparison 1242: Measurement of areal roughness by optical microscopes	173/132
P-31 S. Gao	Characterization of topographic spatial resolution ... using rectangular gratings & sinusoidal pseudo-chirp standards	177/135
P-32 A. Pappas	Comparison of surface texture parameters using CSI, confocal microscopy and focus variation microscopy	181/138
P-33 F. Segel	Evaluation of anisotropic resolutions of optical microscopes using Star-shaped material measures	185/141
P-34 Z. Jiao	Measurement Noise and ITF Characterization of a Phase Shifting Measuring Module of a Hybrid-Microscope	187/142
P-35 R. Artigas	Outline of mechanical & computational methods for non-linearities movement correction for optical profilometry	191/145
P-36 L. Ribotta	Quantitative 3D determination of dimensional parameters of surfaces by optical profilometer's images	195/148
P-37 L. Ribotta	A case study for quant. 3D optical characterization of machined technical surface of a cylindrical master roughness	197/150
P-38 M. Zackaria / A. Felgner	Calibration of the diamond spherical tip of Rockwell hardness indenters using a confocal laser scanning microscope	199/152
P-39 U. Brand	Influence of cooling lubricant residues on the confocal roughness measurement of milled surfaces	203/155
P-40 (P-79) V. Korpelainen	NanoXSpot project: Design+charact. of new gauge for focal spot size det. of X-ray tubes used in industrial computer tomo...	277/211
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P-43 J. Thiesler	A high speed large-range SPM prototype based on a combi. of a magnetic levitation stage and piezo scanners	217/164
P-44 R. Šlesinger	Compressed Sensing Method for Scanning Probe Microscopy based on Gaussian Processes	219/166
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