SMSI 2021 Sensor and Measurement Science International Digital Conference 3–6 May 2021

Conference Program

(as at 2 May 2021)

Day 3: Wednesday, 5 May 2021

Color Index
Sensors and Instrumentation
IRS² Satellite Conference
Measurement Science
System of Units and Metrological Infrastructure

Plenary Talks		
Chair:		G. Gerlach, Technische Universität Dresden, Dresden (Germany)
	08:45	Greeting CIM
		In Measurement we Trust, Prospects Presented during the International Metrology Congress D. Jullien, DigiPlant (France), S. Eichstädt, Physikalisch-Technische Bundesanstalt (PTB), Berlin (Germany)
	09:00	Plenary Talk 5:
		The revised SI for Innovation, Science and the Second Quantum Revolution J. Ullrich, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)
	09:45	Plenary Talk 6:
		Invariance in Measured Quantities across the Sciences W. Fisher, University of California, Berkeley (USA)
	10:30	*Break*

Session A4 Force, Pressure and Torque Measurement			Session B4 Bio and Chemo Sensors			Session C4 Temperature Measurement			Session D4 Advanced Calibration Approaches		
Chair: J. Wilde, Albert-Ludwigs-Universität Freiburg, Freiburg (Germany)			Chair: K. Trieu, Hamburg University of Technology, Hamburg (Germany)			Chair: G. Machin, National Physical Laboratory (NPL), Teddington (Great Britain)			Chair: B. Jeckelmann, Muntelier (Switzerland)		
A4.1	11:00	**A Metrological Atomic Force Microscope for Large Range Measurements with Sub-nanometre Resolution** Y. Wu, E. Wirthmann, U. Klöpzig, T. Hausotte, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen (Germany)	B4.1	11:00	**Single Cell Immobilization at High Flow Rates Using 2PP-traps in a Microfluidic Channel** S. Reede, M. Vellekoop, University of Bremen, Bremen (Germany), H. Müller-Landau, N. Matscheko, U. Rant, Dynamic Biosensors, Martinsried (Germany), F. Lucklum, Technical University of Denmark, Lyngby (Denmark)	C4.1	11:00	**Photonic Thermometry at PTB – Promising First Results for Contact Temperature Metrology Utilizing Optical Sensors** S. Krenek, R. Eisermann, D. Schmid, H. Lai, S. Rudtsch, Physikalisch-Technische Bundesanstalt, Berlin (Germany), G. Winzer, Leibniz-Institut für innovative Mikroelektronik, Frankfurt (Germany), T. Habisreuther, Leibniz-Institut für Photonische Technolgien, Jena (Germany)	D4.1	11:00	**Hydrogen Chloride Optical Gas Standards (OGS) at PTB** J. Nwaboh, Z. Qu, O. Werhahn, V. Ebert, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)
A4.2	11:20	**Development of a Non-invasive Pressure Sensor** P. Szász, V. Migunov, ABB Corporate Research Center, Ladenburg (Germany)	B4.2	11:20	**Sensing Penicillin V in Aqueous Media with MIP Nanoparticle Coatings on QCM** M. Bagheri, O. Gatterbauer, P. Lieberzeit, University of Vienna, Vienna (Austria)	C4.2	11:20	**Reliable Multipoint Temperature Profiling in Hydroprocessing Units** S. Mella, Endress+Hauser Temperature and System Products, Pessano con Bornago (Italy), A. Löffler, M. Schalles, Endress+Hauser Temperature and System Products, Nesselwang (Germany)	D4.2	11:20	**Development of a Traceable Dynamic Force Calibration for Applications like Material Testing Machines** R. Kumme, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)
A4.3	11:40	**Investigations to Determine the Clamping Force of Screw Connections** T. Frank, A. Grün, H. Jayaprakash, M. Kermann, S. Jagomast, A. Cyriax, C. Maier, Th. Ortlepp, Forschungsinstitut für Mikrosensorik GmbH, Erfurt (Germany	B4.3	11:40	**Cognitive Integrated Sensor Systems for In-Hive Varroa Infestation Level Estimation based on Temperature-Modulated Gas Sensing** A. König, TU Kaiserslautern, Kaiserslautern (Germany)	C4.3	11:40	**Modelling Considerations for Resistance Wire Thermometers Applied to Internal Combustion Engines** V. Venkataraman, Y. Murai, M. Liverts, R. Örlü, J. Fransson, A. Cronhjort, KTH Royal Institute of Technology, Stockholm (Sweden), O. Stenlaas, Scania CV AB, Södertälje (Sweden)	D4.3	11:40	**Ro-Vibrational Spectroscopic Gas Thermometry (RVSGT): A New Primary Method for Gas Thermometer Calibrations?** G. Li, V. Ebert, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)
A4.4	12:00	**Theoretical Analysis of Measurement Flexures at the 5 MN C83m Torque Standard Machine at PTB** K. Geva, H. Kahmann, C. Schlegel, R. Kumme, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)	B4.4	12:00	**Proof of Concept Validation of a Swimming Multi Sensor Platform for In-situ Ocean Monitoring** J. Harms, T. Kern, Hamburg University of Technology, Hamburg (Germany)	C4.4	12:00	**Monte-Carlo Analysis of Challenges and Limitations of Dispersion-based Optical Thermometry** A. Röse, P. Köchert, G. Prellinger, F. Pollinger, Physikalisch-Technische Bundesanstalt, Braunschweig, (Germany), E. Manske, Ilmenau University of Technology, Ilmenau (Germany)	D4.4	12:00	**Building Blocks for an Adaptive Software-based Uncertainty Estimation** I. Poroskun, D. Heißelmann, C. Rothleitner, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)
	12:20	*Break*									

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Session A5 MEMS Sensors			Session B5 Chemosensor Applications			Session C5 Process Monitoring			Session D5 Deep Learning and Artificial Intelligence in Measurement		
Chair: R. Kirchner, Technische Universität Dresden, Dresden (Germany)			Chair: S. Zimmermann, Leibniz University of Hannover, Hannover (Germany)			Chair: B. Jakoby, Johannes-Kepler-Universität Linz, Linz (Austria)			Chair: E. Rückert, Montanuniversität Leoben, Leoben (Austria)		
A5.1	13:00	**Design, Simulation, Fabrication and Characterization of Piezoelectric MEMS Cantilever for Gas Density and Viscosity Sensors Applications** A. Mehdaoui, C.Huber, J.Becker, F.Schraner, TrueDyne Sensors AG, Reinach (Switzerland), L.G.Villanueva, Ecole Polytechnique Fédérale de Lausanne, Lausanne (Switzerland)	B5.1	13:00	**Determination of the Dielectric Properties of Ceria and Soot Powders by the Microwave Cavity Perturbation Method** S. Walter, C. Steiner, G. Hagen, R. Moos, University of Bayreuth, Bayreuth (Germany)	C5.1	13:00	**Inline Inspection of Ceramic Tape Casting Processes by Means of Optical, Eddy Current and Machine Learning Methods** T. Härtling, Technische Universität Dresden, Dresden (Germany), M. Heymann, S. Münch, M. Schulze, V. Gupta, C. Schuster, Fraunhofer Institute IKTS, Dresden (Germany), B. Capraro, D. Schabbel, A. Vogel, Fraunhofer Institute IKTS, Hermsdorf (Germany)	D5.1	13:00	**Image-Based Predictive Maintenance Concept for Inkjet Printing of Ceramic Inks** P. Bischoff, C. Zeh, C. Schuster, T. Härtling, Fraunhofer Institute IKTS, Dresden (Germany), C. Kroh, Senodis Technologies GmbH, Dresden (Germany)
A5.2	13:20	**Swarm-Based Multi-Objective Design Optimization of Single-Plate Condenser MEMS Microphone** Q. Zaman, S. Alraho, A. König, TU Kaiserslautern, Kaiserslautern (Germany)	B5.2	13:20	**Simultaneous Quality and Flow Rate Monitoring of Diesel Exhaust Fluid by Using A Platinum Thin Film Sensor** R. Bernhardsgrütter, C. Hepp, Innovative Sensor Technology IST AG, Ebnat-Kappel (Switzerland), J. Wöllenstein, University of Freiburg, Freiburg (Germany), K. Schmitt, Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg (Germany)	C5.2	13:20	**Indirect Geometry Measurement for Laser Chemical Machining Using a Model-based Signal Processing Approach** M. Mikulewitsch, D. Stöbener, A. Fischer, University of Bremen, Bremen (Germany)	D5.2	13:20	**Use of Adaptive Learning Algorithms in Linear Position Measurement Applications** A. Voss, A. Bartos, TE Connectivity Sensors Germany GmbH, Dortmund (Germany)
A5.3	13:40	**Designing Low Power Systems with Digital MEMS Sensors** P. Stukjunger, STMicroelectronics, Prague (Czech Republic)	B5.3	13:40	**Examination of New Catalysts for Catalytic Combustible Gas Sensors by Thermal Analysis** O. Yurchenko, H. Pernau, L. Engel, B. Bierer, M. Jägle, Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg (Germany), J. Wöllenstein, University of Freiburg, Freiburg (Germany)	C5.3	13:40	**Process Monitoring by Impedance Spectroscopy in the Field of Used-sand Regeneration** L. Bifano, A. Fischerauer, G. Fischerauer, Universität Bayreuth, Bayreuth (Germany), M. Weider, TU Bergakademie Freiberg, Freiberg (Germany)	D5.3	13:40	**Known Operator Learning: Hybrid Approaches and Grey Box Models** A. Maier, C. Syben, R. Schielein, D. Pfeufer, Friedrich-Alexander Universität Erlangen-Nürnberg, Erlangen (Germany)
A5.4	14:00	**Self-excited Contact Resonance Operation of a Tactile Piezoresistive Cantilever Microprobe with Diamond Tip** M. Fahrbach, E. Peiner, Technische Universität Braunschweig, Braunschweig (Germany), M. Xu, U. Brand, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)	B5.4	14:00		C5.4	14:00	**Online Washing Process Monitoring with Wireless Textile Impedance Measurement** A. Hennig, F. Essingholt, L. Krupp, A. Grabmaier, Fraunhofer Institute IMS, Duisburg (Germany), H. Prinz, H. Hloch, J. Bohnen, wfk - Cleaning Technology Institute e.V., Krefeld (Germany), M. Roth, Textilforschungsinstitut Thüringen-Vogtland e.V., Greiz (Germany)	D5.4	14:00	**Beyond Explaining: Explainable AI for Model Improvement** S. Lapuschkin, Frauhofer-HHI, Berlin (Germany)+C99
	14:20	*Break*									

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Session A6 Sensor Materials I			Session B6 Flow Measurement			Session C6 Condition Monitoring			Session D6 Advanced Methods and Measurement Systems		
Chair: U. Schmid, Technical University Vienna, Vienna (Austria)			Chair: P. Neyezhmakov, National Scientific Centre "Institute for Metrology" - NSCIM, Khazkiv (Ukraine)			Chair: G. Fischerauer, University Bayreuth, Bayreuth (Germany)			Chair: H. Bosse, Physikalisch-Technische Bundesanstalt (PTB), Braunschweig (Germany)		
A6.1	15:00	**Full Stress Tensor Measurement by Photoelasticity in Silicon** M. Stoehr, S. Schoenfelder, University of Applied Sciences Leipzig, Leipzig (Germany), G. Gerlach, Technische Universität Dresden, Dresden (Germany), T. Härtling, Fraunhofer Institute IKTS, Dresden (Germany)	B6.1	15:00	**Improved Gas Liquid Flow Meter Using a Neural Network** M. da Silva, A. do Nascimento Wrasse, E. Nunes dos Santos, Federal University of Technology - Paraná, Curitiba (Brazil), E. M. Morales, Multiphase Flow Research Center (NUEM - UTFPR), Curitiba (Brazil)	C6.1	15:00	**Inline Quality Monitoring of Diesel Exhaust Fluid (AdBlue) by Using the 3ω-Method** R. Bernhardsgrütter, C. Hepp, Innovative Sensor Technology IST AG, Ebnat-Kappel (Switzerland), M. Jägle, H. Pernau, J. Wöllenstein, University of Freiburg, Freiburg (Germany), K. Schmitt, Fraunhofer Institute IPM, Freiburg (Germany)	D6.1	15:00	**Topography Analysis in the NPMM-200** E. Meta, E. Manske, Technische Universität Ilmenau, Ilmenau (Germany)
A6.2	15:20	**Adding Seebeck Coefficient Measurements to an Existing High Temperature Device for Hall Constant and Electrical Conductivity Measurements** R. Werner, J. Kita, R. Moos, University Bayreuth, Bayreuth (Germany), M Gollner, F. Linseis, Linseis Thermal Analysis, Selb (Germany)	B6.2	15:20	**A Hermetic Sensor Concept for Measuring Condensing Fluid Flows** P. Radler, J. Ringkamp, Heidelberg University, Heidelberg (Germany), P. Lebhardt, J. Langejürgen, Fraunhofer IPA, Mannheim (Germany)	C6.2	15:20	**Operando State Diagnosis of Supported Ionic Liquid Phase Gas Purification Processes by a Resonant Perturbation Method** V. Malashchuk, A. Jess, R. Moos, University of Bayreuth, Bayreuth (Germany)	D6.2	15:20	**Mechanical Design of a New Dynamic Force Transfer Standard** S. Hassan, C. Schlegel, R. Kumme, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany), R. Tutsch, TU Braunschweig, Braunschweig (Germany)
A6.3	15:40	**Epitaxial Graphene on SiC: A Versatile Sensing Platform for High Sensitivity Applications** M. Rodner, Saarland University, Saarbrücken (Germany), D. Puglisi, A. Zilli, J. Eriksson, Linköping University, Linköping (Sweden)	B6.3	15:40	**Towards Standalone Attitude Estimation for Instrumented Flow Followers** L. Buntkiel, S. Reinecke, Helmholtz-Zentrum, Dresden (Germany), U. Hampel, Technische Universität Dresden, Dresden (Germany)	C6.3	15:40	**Advanced Fluid Models for Multi-Parameter Condition Monitoring Systems for Lubricants and Hydraulic Fluids** T. Voglhuber-Brunnmaier, B. Jakoby, Johannes Kepler University, Linz (Austria), A. Niedermayer, F. Feichtinger, Micro Resonant Technologies GmbH, Linz (Austria)	D6.3	15:40	**Thermographic Stall Detection Using Model-Based Evaluations of the Surface Temperature Response to Oscillating Fluid Temperatures** F. Oehme, M. Sorg, A. Fischer, University of Bremen, Bremen (Germany)
A6.4	16:00		B6.4	16:00	**Spectral Response of MEMS Plate Resonators Exhibiting Non-conventional Vibrational Modes in Fluids** D. Platz, A. Gesing, U. Schmid, TU Vienna, Vienna (Austria)	C6.4	16:00	**Investigating the Condition Monitoring of Gearboxes Using Magnetoresistive Sensors** R. Slatter, Sensitec GmbH, Lahnau (Germany)	D6.4	16:00	**Monitoring Inkjet Printer Condition via Image Analysis of Printed Patterns** C. Zeh, P. Bischoff, M. Rjelka, C. Schuster, Fraunhofer Institute IKTS, Dresden (Germany), T. Härtling, Technische Universität Dresden, Dresden (Germany)
	16:20	*Break*									

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Session A7 Packaging and Integration of Sensors			Session B7 Sensor Materials II			Session C7 Testing and Inspection					
Chair: R. Moos, Universität Bayreuth, Bayreuth (Germany)			Chair: U. Schmid, Technical University Vienna, Vienna (Austria)			Chair: C. Tiebe, BAM Bundesanstalt für Materialforschung und -prüfung, Berlin (Germany)					
A7.1	16:40	**Smart Sensor Systems for Extremely Harsh Environments** H. Kappert, Fraunhofer Institute IMS, Duisburg (Germany), S. Schopferer, Fraunhofer Institute EMI, Freuburg (Germany), R. Döring, Fraunhofer Institute ENAS, Chemnitz (Germany), S. Ziesche, Fraunhofer Institute IKTS, Dresden (Germany), A. Olowinsky, Fraunhofer Institute ILT, Aachen (Germany), F. Naumann, Fraunhofer Institute IMWS, Halle (Germany), M. Jägle, Fraunhofer Institute IPM, Freiburg (Germany), A. Ostmann, Fraunhofer Institute IZM, Berlin (Germany)	B7.1	16:40	**Highly Stable Pressure Sensors made of <110> Silicon** T. Frank, R. Röder, S. Jagomast, H. Übensee, A. Cyriax, T. Ortlepp, Forschungsinstitut für Mikrosensorik GmbH, Erfurt (Germany)	C7.1	16:40	**Current Measurement System for Solder Joint Quality Analysis in Photovoltaic Modules** M. Lenzhofer, L. Neumaier, P. Malago, J. Kosel, M. Ortner, Silicon Austria Labs SAL GmbH, Villach (Austria)			
A7.2	17:00	**Evaluation of High Temperature Ceramic Sensor Packages** P. Gierth, L. Rebenklau, H. Barth, Fraunhofer Institute IKTS, Dresden (Germany)	B7.2	17:00	**Influence of the Gas Velocity on the Temperature Homogeneity of Transducers for Gas Sensors** J. Herrmann, T. Kern, G. Hagen, R. Moos, University of Bayreuth, Bayreuth (Germany)	C7.2	17:00	**Testing of High-Power Traction Batteries** J. Büdel, J. Teigelkötter, A. Stock, K. Kuhlmann, Technische Hochschule Aschaffenburg, Aschaffenburg (Germany), K. Lang, P. Ott, Hottinger Brüel & Kjaer GmbH, Darmstadt (Germany)			
A7.3	17:20	**pH Measurement System-on-Foil Aided with a Mixed Signal Processor** M. Fahem, M. Steinmaßl, K. Neumeier, I. Eisele, Fraunhofer Institute EMFT, München (Germany), E. Korek, R. Brederlow, TU München, München (Germany)	B7.3	17:20	**Influences of the Microstructure on the Drift Velocity of Electromigrating Aluminum through Molybdenum Disilicide Thin films** M. Schädel, J. Baldauf, CiS Forschungsinstitut für Mikrosensorik GmbH, Erfurt (Germany)	C7.3	17:20	**Quantitative Evaluation of Artefact Reduction by an Optimized Specimen Orientation for Metrology Based on Industrial Computed Tomography** M. Kaufmann, I. Effenberger, Fraunhofer Institute IPA, Stuttgart (Germany)			
A7.4	17:40	**Miniaturization of Mobile GPR Antenna Assembly** D. Shi, T. Aftab, G. Gidion, L. Reindl, University of Freiburg, Freiburg (Germany), A. Zaragoza, Polytechnic University of Catalonia, Barcelona (Spain)	B7.4	17:40		C7.4	17:40	**Application of Laser Line Scanners for Quality Control during Selective Laser Melting (SLM)** K. Wehnert, S. Schäfer, J. Schmitt, A. Schiffler, University of Applied Sciences Würzburg-Schweinfurt, Schweinfurt (Germany)			
	18:00	*End*									