



# 4<sup>th</sup> International Conference Functional Integrated *nano* Systems

## CONFERENCE PROGRAM

2 – 4 November 2020

Digital Conference – Austria – Time Zone MEZ (UTC+1)

### **Follow live-streamed Presentations**

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### **Live Q&As with all Presenters**

Ask your burning questions directly to the expert speakers in real-time – just like at a physical conference.

### **Present your Poster**

Present your poster in a short online-presentation!

Get in direct touch with delegates and discuss your poster!  
The Poster Session room will be open day 2 & 3!

### **nanofIS 2020 Poster Awards!**

### **Visit & explore Exhibition Booths**

Visit the virtual exhibition area to explore the live demonstrations of the newest technologies & solutions that our exhibitors have to offer!

Get in direct touch! The Exhibition Visitors room will be open day 2 & 3!

Organised by:



# Functional Integrated *nano*Systems Digital Conference

The **nanoFIS 2020** conference is focusing on essential capabilities required for the development of future **Smart Systems** that are core enablers for the digital transformation worldwide.

The topics of **nanoFIS 2020** comprise novel technologies, components and devices enabled by nanotechnology, micro- and nanoelectronics, advanced materials as well as photonics and a variety of other principles. These technologies, components and devices are key for integrating more functionalities into multifunctional Smart Systems.

Exciting lectures and invited talks given by leading international scientists as well as poster presentations offer delegates an excellent opportunity to discuss pioneering developments and to initiate cooperation projects.

## **nano FIS 2020 will highlight latest R&D results in the following topics:**

*Session A* - **ADVANCED FUNCTIONAL MATERIALS**

*Session B* - **NANODEVICES & NANOSYSTEMS**

*Session C* - **NANOANALYTICS, MODELLING & RELIABILITY**

*Session D* - **SYSTEM INTEGRATION TECHNOLOGIES & MANUFACTURING PROCESSES**

### **Keynote Speaker:**



**Mark Brongersma**

Stanford University, Geballe Laboratory for Advanced Materials,  
Department of Materials Science and Engineering, Stanford, CA (USA)

**Flat Optics for Active Wavefront Manipulation and AR/VR**



**Ulrike Diebold**

Vienna University of Technology, Institute of Applied Physics,  
Surface Physics, Vienna (Austria)

**Surface Science of Metal Oxides:  
Looking What Happens at the Atomic Scale**



**Max Shulaker**

MIT - Massachusetts Institute of Technology, Department of Electrical  
Engineering and Computer Science, Cambridge, MA (USA)

**Transforming Ideas to Reality:  
Emerging Nanotechnologies from the "Lab" to the "Fab"**

## Invited Speaker

**Jun Chen**

University of California, Department of Bioengineering, Los Angeles (USA)

**Smart Textiles for Personalized Health Care**



**Charl F.J. Faul**

University of Bristol, Inorganic and Materials Chemistry, School of Chemistry, Bristol (United Kingdom)

**From Amphiphiles to 3D Porous Materials and Flexible Devices – Exploring Electroactive Functional Materials**

**Elvira Fortunato**

Universidade NOVA de Lisboa, Materials Science Department  
Director CENIMAT - Centre for Materials Research, Caparica (Portugal)

**The (R)Evolution of Metal Oxides**



**Tobias Kraus**

INM Leibniz Institute for New Materials, Department of Structure Formation, Innovation Center INM, Saarbrücken (Germany)

**Electronic Multiscale Hybrid Materials: Sinter-Free Inks, Printed Transparent Grids, and Soft Devices**

**Johan Liu**

Chalmers University of Technology, Department of Microtechnology and Nanoscience (MC2), Electronics Materials and Systems Laboratory, Shanghai University, Göteborg (Sweden)

**Atomic Scale Manipulation of Graphene Structure and Functionalization for Achieving Thermal Conductivity beyond Graphite in Bulk Form**



**Stephan Steinhauer**

KTH Royal Institute of Technology, Department of Applied Physics, Quantum Nano Photonics, Stockholm (Sweden)

**Superconducting Nanowire Devices for Light Detection at the Single-Photon Level**

**Andreas Waag**

TU Braunschweig, Institute of Semiconductor Technology, Laboratory of Emerging Nanometrology LENA, Braunschweig (Germany)

**GaN nanoLEDs as Point Light Sources for Optical Excitation in Imaging and Sensing**



**Wei-Yen Woon**

National Central University, Department of Physics, Taoyuan City (Taiwan)

**Growth of Graphene and its Applications**

## Exhibitors & Sponsors

**nanoFIS 2020** serves as an **excellent platform** to **present your company/institution**, to **promote your product portfolio** and to **establish direct links** to a broad audience of experts. Please be welcome to support this event as exhibitor and/or sponsor! As an exhibitor or sponsor you will make a great contribution to the **nanoFIS 2020!**

**Your participation will be acknowledged prominently** in the **conference abstract book**, on **our website** as well as we are offering an **exhibitor's visitor room** to run your product demo for prospective customers and answer their questions in real time.

Be an exhibitor at **nanoFIS 2020!** (Info >> <http://www.nanofis.net/exhibitors-sponsors>)

## Exhibitors With Us Online



### Anton Paar GmbH

Anton Paar produces high-end measuring and laboratory instruments for industry and research. It is the world leader in the measurement of density, concentration and CO<sub>2</sub> and in the field of rheometry. Other areas of specialty are: Petroleum testing, microwave synthesis, viscometry, polarimetry, refractometry, X-ray scattering, sample preparation and surface characterization.

The core competence of Anton Paar – high-precision production – and close contact to the scientific community, form the basis for the quality of Anton Paar's instruments. Continuous training and investments in R&D ensure that Anton Paar products live up to their excellent reputation.

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## Sponsors



### Micromachines – Journal

Micromachines (ISSN 2072-666X), is an international, peer-reviewed Open Access journal of micro/nano-scaled structures, devices, systems as well as related micro- and nanotechnology from fundamental research to applications, published monthly online by MDPI. It is indexed in EI, Scopus, PubMed and Web of Science, and has an Impact Factor of 2.523 (2019).

[www.mdpi.com/journal/micromachines](http://www.mdpi.com/journal/micromachines)



### Proceedings – Journal

Proceedings (ISSN 2504-3900) is an open access journal that dedicated to publishing all kinds of outputs from academic conferences, including abstracts, extended abstracts, proceedings papers, meeting report and posters.

[www.mdpi.com/journal/proceedings](http://www.mdpi.com/journal/proceedings)



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# Program, 2 November 2020

Time Shift Table (program is scheduled in MEZ)	
MEZ – Central European Time (UTC+1)	EST – Eastern Standard Time (UTC-5)
GMT – Greenwich Mean Time (UTC+0)	PST – Pacific Standard Time (UTC-8)
CST – China Standard Time (UTC+8)	

## 8.00 Registration

## 9.00 Opening and Welcome

tba, *City of Graz, Austria*

**Reinhold Ebner, Gisele E. Amancio, Anton Köck**, *Materials Center Leoben Forschung GmbH, Austria*

**Margit Malatschnig**, *Techkonnex - High-Tech Promotion, Austria*

## NANODEVICES AND NANOSYSTEMS I

**09.20 Growth of Graphene and its Applications** (Invited Speaker) / 16.20 CST (UTC+8)  
**Wei-Yen Woon**, National Central University, Department of Physics, Taoyuan City (Taiwan)

**09.50 Powerhouse-on-Chip — Ultrathin microfabricated thermoelectric array for thermal energy harvesting** / 16.50 CST (UTC+8)  
**Zhiyu (Jerry) Hu**, INME\_Institute NanoMicroEnergy, Micro/Nano-Electronics, Shanghai (China)

**10.10 Miniaturized Thermal Acoustic Gas Sensor based on a CMOS Microhotplate and MEMS Microphone** / 09.10 GMT (UTC+0)  
**Richard Hopper**, Cambridge University, Department of Engineering, Cambridge (UK)

**10.30 An Embedded, Low Power, Wireless NO<sub>2</sub> Gas Sensing Platform Based on a Single-Walled Carbon Nanotube Transducer** / 10.30 MEZ (UTC+1)  
**Stefan Nedelcu**, ETH Zürich, Micro- and Nanosystems, Zürich (Switzerland)



### 10.50 Coffee Break



## NANODEVICES AND NANOSYSTEMS II

**11.20 Superconducting Nanowire Devices for Light Detection at the Single-Photon Level** (Invited Speaker) / 11.20 MEZ (UTC+1)  
**Stephan Steinhauer**, KTH Royal Institute of Technology, Department of Applied Physics, Quantum Nano Photonics, Stockholm (Sweden)

**11.50 Functionalization of Multi-Layer Graphene-Based Gas Sensor by Au Nanoparticles** / 11.50 MEZ (UTC+1)  
**Sten Vollebregt**, Delft University of Technology, Microelectronics, Delft (Netherlands)

**12.10 Passive Visible Light Sensing of Retroreflective Foils on a Moving Object for Indoor Application** / 12.10 MEZ (UTC+1)  
**Andreas Peter Weiss**, JOANNEUM RESEARCH Forschungsges.m.b.H, Institute of Surface Technologies and Photonics, Pinkafeld (Austria)

**12.30 Design Considerations of Ultra-Low-Power Polymer Gas Microsensors Based on Noise Analysis** / 12.30 MEZ (UTC+1)  
**Rafael Puyol**, Université catholique de Louvain, Institute of Information and Communication Technologies, Electronics and Applied Mathematics (ICTEAM), Louvain-la-Neuve (Belgium)



### 12.50 Lunch Break



# Program, 2 November 2020

## ADVANCED FUNCTIONAL MATERIALS I

### 13.45 Influence of Relative Humidity on the Sensor Response of Metal Oxide Decorated Graphene Gas Sensors / 13.45 MEZ (UTC+1)

**Marius Rodner**, Linköping University, Department of Physics, Chemistry and Biology, Linköping (Sweden)

### 14.05 Photoconductivity of Colloidal Quantum Dot Films in Plasmonic Nanogaps / 14.05 MEZ (UTC+1)

**Dario Grimaldi**, University of Graz, Nanooptics, Graz (Austria)

### 14.25 Si-Ti-W-AlCu Thin Film Stacks Investigated with SThM and TDTR for Improved Thermal Management / 14.25 MEZ (UTC+1)

**Katrin Fladischer**, Materials Center Leoben Forschung GmbH, Microelectronics, Leoben (Austria)

## 14.45 KEY NOTE LECTURE

### Transforming Ideas to Reality: Emerging Nanotechnologies from the “Lab” to the “Fab” / 08.45 EST (UTC-5)

**Max Shulaker**, MIT - Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, Cambridge, MA (USA)

### 15.30 Smart Textiles for Personalized Health Care (Invited Speaker) / 06.30 PST (UTC -8)

**Jun Chen**, University of California, Department of Bioengineering, Los Angeles (USA)



## 16.00 Coffee Break



### 16.15 Exhibitors' Presentations / 16.15 MEZ (UTC+1)

To contact the exhibitors, the “Exhibition Visitor Room” will be open on November 3<sup>rd</sup> and 4<sup>th</sup> in parallel to the technical program.



16.30



**Anton Paar**

16.45

**RAITH**  
NANOFABRICATION

17.00

### 17.00 Poster Short Presentations / 17.00 MEZ (UTC+1)

Rules: in this session each poster will be presented in a short online presentation. To visit and discuss the posters detailed, the “Poster Hall” will be open on 3 – 4 November 2020 in parallel to the technical program.

Poster Prizes are sponsored by:

**MDPI micromachines, Switzerland**

**MCL Materials Center Leoben Forschung GmbH, Austria**

**MDPI nanomaterials, Switzerland**



## Program, 3 November 2020

### ADVANCED FUNCTIONAL MATERIALS II

**09.00 The (R)Evolution of Metal Oxides (Invited Speaker)** / 8.00 GMT (UTC+0)  
**Elvira Fortunato**, Universidade NOVA de Lisboa, Materials Science Department, Director  
CENIMAT - Centre for Materials Research, Caparica (Portugal)

**09.30 Functionalized SnO<sub>2</sub> Sensors on Flexible Substrate for Ammonia Detection at Low Temperature** / 09.30 MEZ (UTC+1)  
**Jean-Paul Viricelle**, Mines Saint-Etienne, Centre SPIN, Saint-Etienne (France)

**09.50 Temperature Cycled Operation and Multivariate Statistics for Electronic-Nose Applications using Field Effect Transistors** / 09.50 MEZ (UTC+1)  
**Guillem Domènech-Gil**, Linköping University, Sensor and Actuator Systems, IFM,  
Linköping (Sweden)

**10.10 Endohedral Functionalization of Metallicity-Sorted Single-Walled Carbon Nanotubes** / 10.10 MEZ (UTC+1)  
**Marianna V. Kharlamova**, Vienna University of Technology, Institute of Materials  
Chemistry, Vienna (Austria)



**10.30 Coffee Break**



### ADVANCED FUNCTIONAL MATERIALS III

**11.00 From Amphiphiles to 3D Porous Materials and Flexible Devices – Exploring Electroactive Functional Materials (Invited Speaker)** / 10.00 GMT (UTC+0)  
**Charl F.J. Faul**, University of Bristol, Inorganic and Materials Chemistry, School of  
Chemistry, Bristol (United Kingdom)

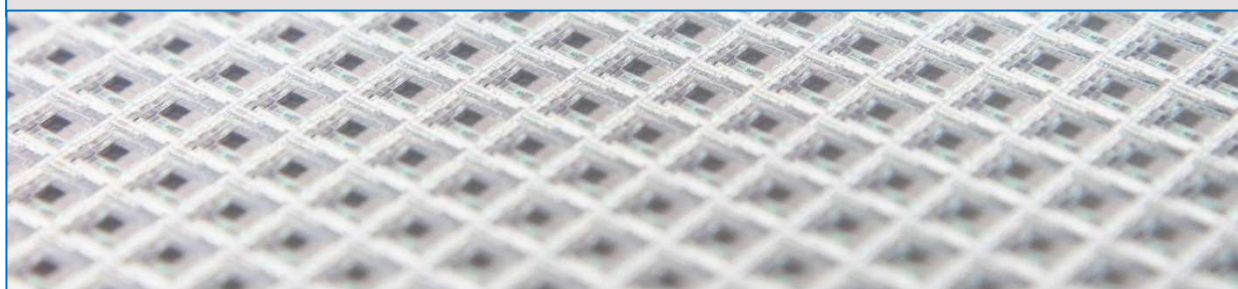
**11.30 Ordered Porphyrin Arrays on Fe(001): an Enabling Technology for Future Spintronics** / 11.30 MEZ (UTC+1)  
**Guglielmo Albani**, Politecnico de Milano, Physics, Milan (Italy)

**11.50 Fast and Reversible Acid Sensor Based on Porphycene** / 11.50 MEZ (UTC+1)  
**Alberto Bossi**, Consiglio Nazionale delle Ricerche (CNR), Istituto di Scienze e Tenologie  
Chimiche "G. Natta" (CNR-SCITEC), Milan (Italy)

**12.10 In-situ Spectroelectrochemical Study of Conductive Polyaniline Forms for Sensor Applications** / 12.10 MEZ (UTC+1)  
**Kristina Žagar Soderžnik**, Jožef Stefan Institute, Department for Nanostructured  
Materials, Ljubljana (Slovenia)



**12.30 Lunch Break**



## Program, 3 November 2020

### ADVANCED FUNCTIONAL MATERIALS IV

**13.40 Aerosol Jet Printed Nanocarbons on Heat Sink Materials** / 13.40 MEZ (UTC+1)  
**Reinhard Kaindl**, JOANNEUM RESEARCH Forschungsgesellschaft mbH, MATERIALS - Institute of Surface Technologies and Photonics, Niklasdorf (Austria)

**14.00 Lead-Free Perovskite Solar Cells Based on Triple Cation Tin Halide Perovskites** / 14.00 MEZ (UTC+1)  
**Thomas Rath**, Graz University of Technology, Institute for Chemistry and Technology of Materials (ICTM), Graz (Austria)

**14.20 Nanostructured Materials Based on Thin Films and Nanoclusters for Hydrogen Gas Sensing** / 14.20 MEZ (UTC+1)  
**Stanislav Haviar**, University of West Bohemia, Department of Physics, Pilsen (Czech Republic)

### SYSTEM INTEGRATION TECHNOLOGIES & MANUFACTURING PROCESSES I

**14.40 Atomic Scale Manipulation of Graphene Structure and Functionalization for Achieving Thermal Conductivity beyond Graphite in Bulk Form** (Invited Speaker) / 14.40 MEZ (UTC+1)  
**Johan Liu**, Chalmers University of Technology, Department of Microtechnology and Nanoscience (MC2), Electronics Materials and Systems Laboratory, Göteborg (Sweden)

**15.10 Patterning of Piezoelectric Films by Inkjet Printing** / 15.10 MEZ (UTC+1)  
**Nicolas Godard**, Luxembourg Institute of Science and Technology (LIST), Materials Research and Technology (MRT), Belvaux (Luxembourg)



### 15.30 Coffee Break



**16.00 Ablative Laser Structuring for Stretchable Multilayer and Multi-Material Electronics and Sensor Systems** / 16.00MEZ (UTC+1)  
**Simon Stier**, Fraunhofer ISC, Center Smart Materials and Adaptive Systems, Würzburg (Germany)

**16.20 Cu pillar planarization to enhance thermosonic flipchip bonding for 3D die stacking** / 16.20 MEZ (UTC+1)  
**Ali Roshanghias**, Silicon Austria Labs - SAL, Heterogeneous Integration Technologies, Villach (Austria)

**16.40 Novel EBL/FIB Patterning Approaches for Cutting-Edge Applications**  
**Jörg Stodolka**, Raith GmbH, Sales, Dortmund (Germany) / 16.40 MEZ (UTC+1)

### 17.00 KEY NOTE LECTURE

**Flat Optics for Active Wavefront Manipulation and AR/VR** / 08.00 PST (UST-8)  
**Mark Bringersma**, Stanford University, Geballe Laboratory for Advanced Materials, Department of Materials Science and Engineering, Stanford, CA (USA)

– 17.45 MEZ (UTC+1) End of Technical Sessions –

### Call for POSTER is still open >> 27 September 2020

All abstracts submitted **until 27 September 2020** will be included in the **conference proceedings!** We are collaborating with MDPI, Basel, Switzerland, both on the abstract submission as well as on the option for a Full Paper:

- All accepted 2-page Abstracts will be summarized to the nanoFIS 2020 proceedings.
- All nanoFIS 2020 contributors are invited to submit a full paper, which will be published online as Special Issue "**nanoFIS 2020 - Integrated Functional nanoSystems**", in the MDPI journal "Micromachines" (ISSN 2072-666X, [https://www.mdpi.com/journal/micromachines/special\\_issues/nanoFIS2020](https://www.mdpi.com/journal/micromachines/special_issues/nanoFIS2020); Impact Factor 2.426).  
Full Paper >> [www.nanofis.net/poster-submission/full-paper-submission-mdpi-micromachines](https://www.nanofis.net/poster-submission/full-paper-submission-mdpi-micromachines)



## Program, 4 November 2020

### SYSTEM INTEGRATION TECHNOLOGIES & MANUFACTURING PROCESSES II

#### 09.00 Electronic Multiscale Hybrid Materials: Sinter-Free Inks, Printed Transparent Grids, and Soft Devices (Invited Speaker) / 09.00 MEZ (UTC+1)

**Tobias Kraus**, INM Leibniz Institute for New Materials, Department of Structure Formation, Innovation Center INM, Saarbrücken (Germany)

#### 09.30 Wafer Level Bonding with Nano Porous Gold / 09.30 MEZ (UTC+1)

**Paul Soumya Deep**, Fraunhofer ENAS, System Packaging, Chemnitz (Germany)

#### 09.50 Vacuum Packaging Requirements for MEMS and Characterization Techniques / 09.50 MEZ (UTC+1)

**Luca Mauri**, SAES Getters SpA, Research and Development, Lainate (Italy)

#### 10.10 Light-Free Cross-Talk Analysis of a CMOS Infrared Detector Array / 9.10 GMT (UTC+0)

**Ying Dai**, University of Cambridge, Engineering, Cambridge (UK)

#### 10.30 Current Perspectives for Autonomous Sensor Nodes / 10.30 MEZ (UTC+1)

**Marco Deluca**, Materials Center Leoben Forschung GmbH, Microelectronics, Leoben (Austria)



**10.50  
Coffee Break**



### NANOANALYTICS, MODELLING & RELIABILITY

#### 11.20 KEY NOTE LECTURE / 11.20 MEZ (UTC+1)

##### Surface Science of Metal Oxides: Looking What Happens at the Atomic Scale

**Ulrike Diebold**, TU Wien, Institute of Applied Physics, Surface Physics, Vienna (Austria)

#### 12.05 GaN nanoLEDs as Point Light Sources for Optical Excitation in Imaging and Sensing (Invited Speaker) / 12.05 MEZ (UTC+1)

**Andreas Waag**, TU Braunschweig, Institute of Semiconductor Technology, Laboratory of Emerging Nanometrology LENA, Braunschweig (Germany)

#### 12.35 Revisiting Colorimetric Gas Sensors: Compact, Versatile and Cost-Effective / 12.35 MEZ (UTC+1)

**Daniel J. Prades**, Universitat de Barcelona (UB), Department of Electronics and Biomedical Engineering, IN2UB – MIND, Barcelona (Spain)

#### 12.55 Thermal Investigation of nm-Thin Multilayer Structures of an AlGaIn-GaN HEMT / 12.55 MEZ (UTC+1)

**Lisa Mitterhuber**, Materials Center Leoben Forschung GmbH, Microelectronics, Leoben (Austria)

**13.15 - 13.30** / MEZ (UTC+1)

**Poster Award Presentation  
Closing Remarks**



– 13.30 End Conference MEZ (UTC+1) –

# nano FIS 2020 – Functional Integrated nano Systems

nano FIS 2020, 2 – 4 November 2020

This year's conference will be held digital!

I [www.nanofis.net](http://www.nanofis.net)

**INFORMATION**

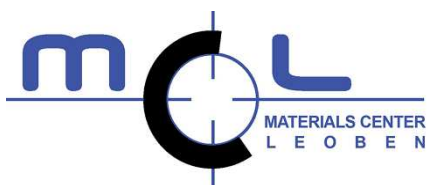
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