

Welcome to the

# Innovation Dialog!



## SENSOR+TEST

DIE MESSTECHNIK - MESSE  
The Measurement Fair

**Nuremberg, Germany**

**9-11 May 2023**

### Efficient and personal:

Highly concentrated information and broad consultation by international experts

### Based on scientific facts:

International conferences and meetings provide insights into tomorrow's technology

### From sensing to evaluation:

Measuring, testing, and monitoring solutions to enable innovation in all industries



**Veranstalter / Organizer**  
AMA Verband für Sensorik und  
Messtechnik e.V.  
Sophie-Charlotten-Str. 15  
14059 Berlin / Germany  
www.ama-sensorik.de



contact@smsi-conference.com  
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Service Company of AMA  
Association for Sensors  
Technology

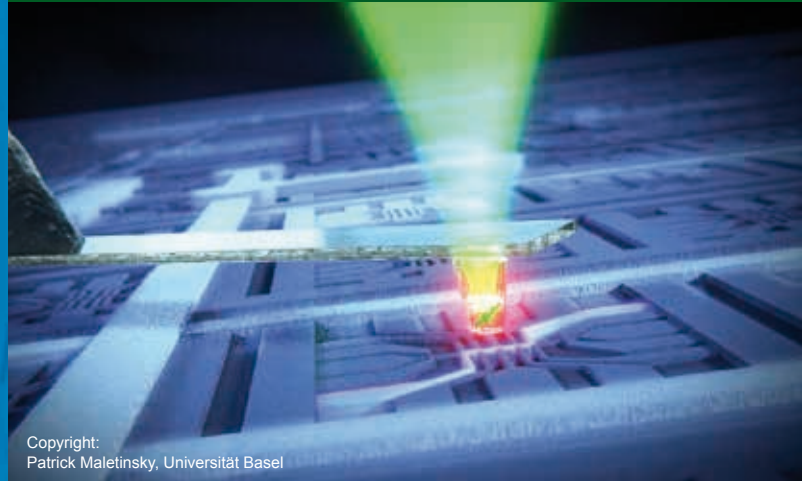
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# SMSI 2023

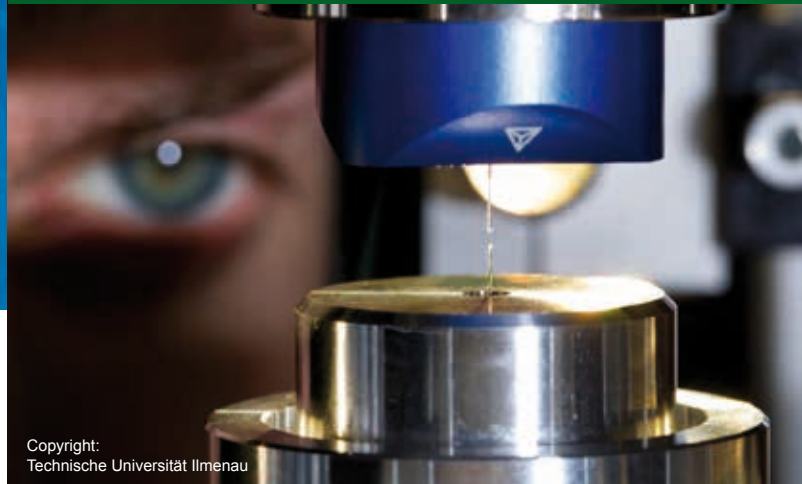
Sensor and Measurement  
Science International

8-11 May 2023  
Nuremberg, Germany



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## Call for Papers



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Technische Universität Ilmenau

**www.smsi-conference.com**



**AMA Association for Sensors and Measurement**

### **Nuremberg live**

Nuremberg offers a variety of attractive leisure facilities. The city is charming with rich culture and beautiful medieval architecture. The lovingly restored old town with its picturesque streets and historically significant buildings invites visitors to take a stroll and relax in one of the numerous cafes.

### **Tradition and innovation - the mix counts**

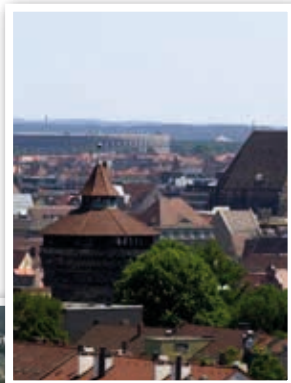
The mix of old and living traditions of Nuremberg and the open-minded people create a particularly friendly atmosphere. Here one can combine business and pleasure in an enjoyable way.

### **After-business pleasure**

At the end of the day explore the Southern German lifestyle and enjoy the exhibition in the lovely old town quarter of Nuremberg. One more tip: Stay a day longer in Nuremberg and enjoy everything the city has to offer at your leisure.

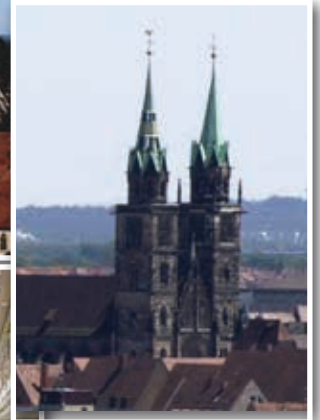
### **Museums & exhibitions**

Explore Nuremberg's 29 museums. From contemporary art to the High Middle Ages. From the Documentation Centre in the Nazi Party rally grounds to the New Museum for Art and Design. From the Germanic National Museum to the Museum of Industrial Culture.



### **Restaurants & nightlife**

From Franconian grilled sausage to Japanese sushi train – Nuremberg offers culinary delights for every taste. You can dance till dawn. Fancy a taste?



### **Music & events**

From Bards' Gathering to the International Organ Festival, from Open Air Classics to Rock in the Park, from "Christkindlesmarkt" to Norisring motor racing - Nuremberg has lots of music festivals and events.

### **Local recreation areas**

From Franconian Switzerland to the new Franconian Lakes - Nuremberg's surroundings offer numerous attractive recreation areas. Take a trip!

### **More information available at:**

[www.tourismus.nuernberg.de](http://www.tourismus.nuernberg.de)

[www.nuernberg.de](http://www.nuernberg.de) - Information about Nuremberg

# SMSI 2023 - Call for Papers

Final submission date: 15 November 2022

## Call for Papers

Welcome to the Sensor and Measurement Science International Conference SMSI 2023.

We invite you to continue the success story of scientific conferences in the field of sensor and measurement technology in Nuremberg. Within the framework of the leading international trade fair SENSOR+TEST, institutions and organizations have been linking up for more than three decades to form sustainable networks from science, industry, research and development in order to stimulate the exchange of ideas and to successfully implement joint scientific projects.

We are bundling the AMA's many years of experience from conferences, symposia and expert panels into a joint event with international visibility and cordially invite you to the second Sensor and Measurement Science International (SMSI) conference.


With SMSI 2023, we are taking a holistic approach to sensors and instrumentation, measurement science and metrology, represented by three individual pillars, each with a clear scientific focus, but linked by the vision to promote and contribute to the ongoing digitalization. As a consequence, we have carefully revised our scientific program in the three pillars for SMSI 2023 compared to the previous conference to address the technical challenges of the future by including topics from emerging and rapidly advancing technology areas, such as quantum sensing and quantum metrology, smart measurement and sensor systems, as well as the digital, international measurement data exchange via blockchain.

We bring together international level experts from the fields of sensing and instrumentation, measurement science and metrological infrastructure. Together with our partners from science, industry, as well as national and international research institutions, we plan to develop the biennial SMSI conference series into one of the leading events in these three most important fields of digitalization.

It is therefore our special pleasure to invite you to participate in SMSI 2023. The SMSI 2023, Sensor and Measurement Science International conference, will be held at the Nuremberg Exhibition Center from May 8 to 11, 2023. A number of international renowned experts have already confirmed to give a plenary talk or have expressed their willingness to participate.

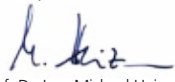
Please submit your short paper by 15 November 2022 at <https://www.smsi-conference.com/submission-short-papers>.

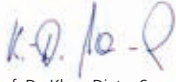
We look forward to your participation!

  
Univ. Prof. Dr. Ulrich Schmid  
Technical University Vienna

General Chair

[contact@smsi-conference.com](mailto:contact@smsi-conference.com)  
[www.smsi-conference.com](http://www.smsi-conference.com)

  
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General Co-Chair

  
Prof. Dr. Klaus-Dieter Sommer  
Technische Universität  
Ilmenau  
General Co-Chair

**AMA Association for Sensor and Measurement - Linking Innovators**  
Network and Representative of Interest for the Sector for Sensor and Measurement Technology.

The AMA Association for Sensors and Measurement (Verband für Sensorik und Messtechnik) with its 450 members is Europe's leading network for the key sector of sensor and measurement technology.

AMA is the first point of contact for all topics relating to sensors and measuring technology and offers an overview of sensors, measuring and testing technology with its detailed industry directory. The AMA Directory of Suppliers is an invaluable tool for application engineers seeking specific technology or know-how.

AMA publishes the Journal of Sensors and Sensor Systems (JSSS). It is an international open-access journal dedicated to science, application, and advancement of sensors and sensors as part of measurement systems. The emphasis is on sensor principles and phenomena, measuring systems, sensor technologies, and applications.

The association promotes the innovation dialog at the leading trade fair SENSOR+TEST, at joint stands of important leading trade fairs in Germany and abroad and at the scientific congress SMSI 2023.

[www.ama-sensorik.de/en](http://www.ama-sensorik.de/en)



# SMSI 2023 - Call for Papers

Final submission date: 15 November 2022

## SMSI Conference Committee

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Ulrich Schmid

Technical University Vienna (Austria)

### Sensors and Instrumentation

including Satellite Conference IRS<sup>2</sup>

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Gerald Gerlach  
Thomas Ortlepp (IRS2)

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Klaus-Dieter Sommer

Karlsruher Institut für Technologie (Germany)

Technische Universität Ilmenau (Germany)

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Luca Mari  
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Université Savoie Mont Blanc, Chambéry (France)  
University Carlo Cattaneo, Castellanza (Italy)  
Johannes-Kepler-University Linz (Austria)

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Fengzhou Fang  
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University of Dublin, Dublin (Ireland)  
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NPL National Physical Laboratory, Teddington (GB)  
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University Paderborn (Germany)

Beat Jeckelmann  
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Muntelier (Switzerland)  
NIM National Institute of Metrology, Beijing (P. R. China)

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National Institute of Standards and Technology

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University Braunschweig (Germany)

Universidad Nacional de San Martín - UNSAM (Argentina)



# SMSI 2023 - Call for Papers

Final submission date: 15 November 2022

## System of Units and Metrological Infrastructure

### Topical Chairs

Beat Jeckelmann	Muntelier (Switzerland)
Matthias Bartholmai	Federal Institute for Materials Research and Testing BAM, Berlin (Germany)
Pavel Neyezhmakov	National Scientific Centre "Institute for Metrology" - NSCIM, Khazkiv (Ukraine)
Frank Lienesch	Physikalisch-Technische Bundesanstalt PTB (Germany)
<b>Members</b>	
Cosimi Corleto	CFM Collège Français de Métrologie, Paris (France)
Ashok Ganesh	CEN-CENELEC - European Committee for Standardization (CEN) and European Committee for Electrotechnical Standardization (CENELED), (Belgium)
Eric Georgin	Centre Technique des Industries Aéronautiques et Thermiques - CETIAT, Villeurbanne (France)
Jay H. Hendricks	National Institute of Standards and Technology - NIST, Gaithersburg (USA)
Florestan Ogheard	Centre Technique des Industries Aéronautiques et Thermiques - CETIAT (France)
Gert Rietveld	VSL Dutch Metrology Institute, Delft (The Netherlands)
Carlo Tiebe	Federal Institute for Materials Research and Testing (BAM), Berlin (Germany)
Michael Melzer	Federal Institute for Materials Research and Testing (BAM), Berlin (Germany)
Jens Zosel	Kurt-Schwabe-Institut für Mess- und Sensortechnik e.V., Meinsberg (Germany)

## Collaborating Institutions and Organizations

- AHMT - German Working Group of Professors in Measurement Technology
- BAM - Federal Institute for Materials Research and Testing (Germany)
- BIPM - Bureau International de Poids and Mesures (France)
- CETIAT - Centre Technique des Industries Aéronautiques et Thermiques (France)
- COOMET - Euro-Asian Cooperation of National Metrological Institutions
- EURAMET - The European Association of National Metrology Institutes
- METAS - Federal Institute of Metrology (Switzerland)
- GMA - Society for Measurement and Automatic Control (Germany)
- IMEKO - International Measurement Federation (Hungary)
- INTI - Instituto Nacional de Tecnología Industrial (Argentina)
- Italian National Agency for New Technologies, Energy and Sustainable Economic Development (Italy)
- MSC - Measurement Science Conference (USA)
- NCSLI - National Conference of Standard Laboratories International (USA)
- NIST - National Institute of Standards and Technology (USA)
- PTB - Physikalisch-Technische Bundesanstalt (Germany)
- RISE - The Swedish Research Institute (Sweden)

Supporting Institutions:



# SMSI 2023 - Call for Papers

Final submission date: 15 November 2022

## Sensors and Instrumentation

### A Sensor principles and quantities

- |                 |                           |
|-----------------|---------------------------|
| A.1 Mechanical  | A.7 Flow                  |
| A.2 Optical     | A.8 Magnetic              |
| A.3 Temperature | A.9 Impedance             |
| A.4 Humidity    | A.10 Chemo and biosensors |
| A.5 Ultrasonic  | A.11 Terahertz            |
| A.6 Acoustic    | A.12 Quantum Sensors      |

### B Sensor materials and technology

- |                             |  |
|-----------------------------|--|
| B.1 Design                  | B.6 Packaging and integration of sensors |
| B.2 Modeling and simulation | B.7 Nanotechnology                       |
| B.3 Materials               | B.8 Additive manufacturing               |
| B.4 MEMS technology         |  |
| B.5 Fabrication             |  |

### C Sensor interface electronics

- |  |                                     |
|--|-------------------------------------|
| C.1 Readout circuits                         | C.6 Stability and harsh conditions  |
| C.2 Signal conditioning                      | C.7 Low power and energy harvesting |
| C.3 Conversion and digitization              |                                     |
| C.4 Signal processing                        |                                     |
| C.5 Interface electronics for high precision |                                     |

### D Applications

- |                                  |                         |
|----------------------------------|-------------------------|
| D.1 Process-measuring technology | D.6 Mobility            |
| D.2 Manufacturing technology     | D.7 Safety and security |
| D.3 Robotics                     | D.8 Health              |
| D.4 Energy technology            | D.9 Smart living        |
| D.5 Environmental monitoring     | D.10 IoT                |

## Recruiting Tutorials

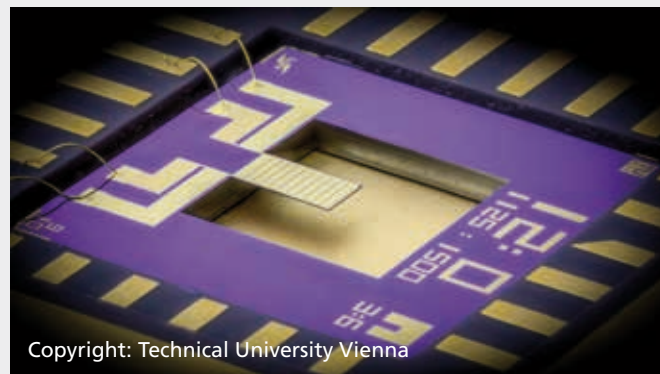
The SMSI Conference Committee would like to invite experts to submit tutorial proposals for enriching the SMSI 2023.

Tutorials will take place on Monday, 08. May 2023, at the Exhibition Center in Nuremberg, Germany.

Participation information at:  
<https://www.smsi-conference.com/tutorials>

## Satellite Conference: IRS<sup>2</sup> 2023 - Infrared Sensors and Systems

- |                          |                     |
|--------------------------|---------------------|
| S.1 IR thermal detectors | S.5 Pyrometry       |
| S.2 IR photon detectors  | S.6 Gas analysis    |
| S.3 IR system components | S.7 IR spectroscopy |
| S.4 Thermal imaging      | S.8 Applications    |



## Young Scientist and Company Science Slam Apply now

**Session Chair: Lara Hoffmann, PTB Berlin**

Take part in this modern form of scientific communication and you can get a free ticket for the SMSI conference (worth 695 Euros).

Participation information at:  
<https://www.smsi-conference.com/science-slam>

**Measurement Science**

**E Measurement Foundations**

- |   |  |
|---|--|
| E.1 Underlying mathematical, statistical and information theory | E.4 Mathematics and modelling in Measurement                 |
| E.2 Signal processing, data analysis and information fusion     | E.5 Evaluation of measurement uncertainty                    |
| E.3 Dynamic quantities and state estimation                     | E.6 Measurement and evaluation of nonquantitative properties |

**F Networked and IoT-related Measurement Systems**

- |  |   |
|--|---|
| F.1 Aggregated sensor and measurement systems          | F.4 Redundant Information and Self-X strategies                 |
| F.2 "Soft Sensors" and practical information fusion    | F.5 Synchronization and dynamic modelling of aggregated systems |
| F.3 Smart sensor applications and condition monitoring | F.6 Autonomous measurement systems                              |

**G Advanced Measurement Approaches**

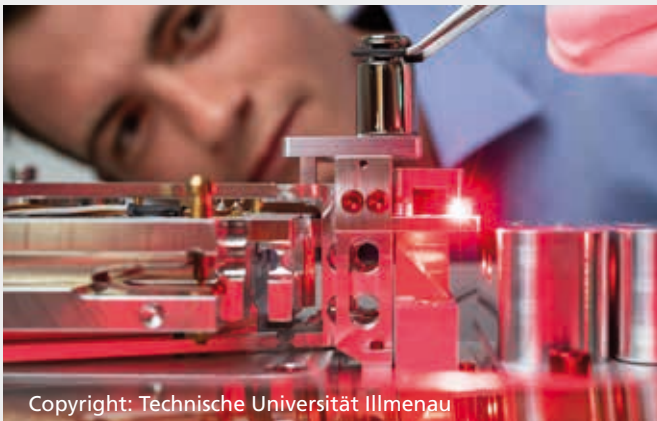
- |   |  |
|---|--|
| G.1 Quantum-based measurements, One-step-traceability solutions | G.3 Parametric and data-driven modelling approaches  |
| G.2 Numerical simulation Approaches                             | G.4 Virtual systems and digital twins in measurement |

**H AI Approaches in Measurement**

- |   |   |
|---|---|
| H.1 Measurement systems with cognitive features             | H.3 Explainable and transparent AI in measurement |
| H.2 Quality assessment of data-driven and cognitive systems |   |

**I Science of measurement and its applications**

- |                                     |   |
|-------------------------------------|---|
| I.1 Production process and robotics | I.4 Mobility                                |
| I.2 Energy supply and quality       | I.5 Safety and security                     |
| I.3 Environmental protection        | I.6 Health and socio-technical applications |



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**System of Units and Metrological Infrastructure**

**K Revised SI and its Opportunities**

- |   |   |
|---|---|
| K.1 New definitions of units and scales | K.2 Traditional and quantum-based measurement standards |
|---|---|

**L Metrology in the digital age**

- |                                     |  |
|-------------------------------------|--|
| L.1 Novel traceability schemes      | L.4 Technology and knowledge transfer      |
| L.2 Data analysis and qualification | L.5 Future metrological infrastructures    |
| L.3 Robust simulation and modeling  | L.6 International cooperation in metrology |

**M Advanced Calibration Approaches**

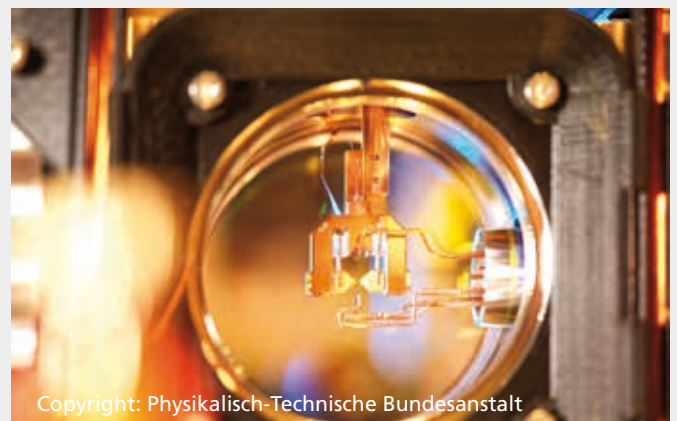
- |   |   |
|---|---|
| M.1 Calibration approaches for networked measuring systems                  | M.4 Remote and on-site calibration, self-calibration              |
| M.2 Synchronization and dynamic calibration of aggregated measuring systems | M.5 Measurement uncertainty evaluation in calibration and testing |
| M.3 Digital twins and virtual representations in metrology                  | M.6 Software for calibration purposes                             |

**N Advanced Testing Methods**

- |  |   |
|--|---|
| N.1 Advances in testing and inspection | N.3 Structural health monitoring                    |
| N.2 Reference materials                | N.4 Advanced metrology and testing in manufacturing |

**P Metrology in regulation and standards**

- |  |  |
|--|--|
| P.1 New regulations and standards                        | P.3 Accreditations and proof of competence |
| P.2 Risk analysis in metrology and conformity assessment | P.4 Digital data and certificates exchange |



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# SMSI 2023 - Call for Papers

Final submission date: 15 November 2022

## Submission of Short Papers

Interested authors are kindly requested to submit a Short Paper (as PDF file) of their work for oral or poster presentation by 15 November 2022 at <https://www.smsi-conference.com/submission-short-papers>. All Short Papers will undergo a peer-review procedure.

## Deadlines

Short Paper (2-pager) submission: **15 November 2022**  
Notification to authors: **15 February 2023**

## Information on Short Papers and Proceedings:

- Only Short Papers using the official template (available on <https://www.smsi-conference.com/smsi2023-template>) will be accepted.
- Maximum length of Short Paper: 2 pages
- Accepted Short Papers **will be transferred to the proceedings directly!** Authors do not need to submit separate papers for the proceedings.
- Proceedings papers (Short Papers) will receive a DOI (Digital Object identifier) number and will be published at [www.ama-science.org](http://www.ama-science.org).
- Authors of papers presented at the SMSI Conference will be offered the opportunity to publish an extended paper (max. 8 pages) in the open-access journal JSSS, Journal of Sensors and Sensor Systems ([www.journal-of-sensors-and-sensor-systems.net](http://www.journal-of-sensors-and-sensor-systems.net)) at a special rate. Authors are also encouraged to publish an extended paper in the scientific journal "tm – Technisches Messen" (<https://degruyter.com/view/j/tme>). Other than the conference publication on [ama-science.org](http://ama-science.org), both - JSSS and tm - are peer-reviewed journals and are indexed in Scopus and the Web of Science.
- Presenting authors must **register for the conference and pay the conference fee by 8 March 2023 the latest**. Otherwise, the Short Paper will not be included in the proceedings.
- A maximum of two Short Papers by each registered author will be accepted, regardless the type of presentation.

## Lecture Sessions

20 minutes are allocated for each presentation (incl. 5 minutes for discussion). The presentation language will be English.

## Poster Session

Authors of the Poster Session are requested to prepare a poster in English (90 cm width x 120 cm height) and to bring it along to the conference.

## Science Slam Session

Interested authors can submit a Science Slam video and participate in the Science Slam presentation instead of a lecture. Contact the organizing team early at [contact@smsi-conference.com](mailto:contact@smsi-conference.com)

## Registration fees for authors

Author fee	695 Euros incl. VAT
Author fee for PhD students:	620 Euros incl. VAT
Author fee for graduate students:	540 Euros incl. VAT

The registration fee for authors includes:

- Participation in the SMSI 2023 Conference all days except Tutorials
- Proceedings
- SENSOR+TEST 2023 exhibition guide
- Admission to the SENSOR+TEST exhibition
- Refreshments
- Welcome reception on 08 May 2023
- Conference Dinner
- Reduced rate for publication of an extended paper in the open-access journal JSSS

Please note: Submission of a Short Paper implies the intent of at least one author to register, to attend the conference and to present the paper or poster as scheduled.

## Best Paper Awards

The SMSI Conference Committee will award the

- Best Paper Award
  - Best Poster Award and
  - Best Young Scientists Award (up to the age of 35 years)
- at the farewell reception on the last day of the conference.



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