ISSS ICSMSS-2020

9th International Conference on

Smart Materials, Structures & Systems

IoT

Smart Manufacturing

Wearable Technologies

Photonics

Jointly Organized by

Institute of Smart Structures & Systems (ISSS) | Indian Institute of Science (IISc) | Central Manufacturing Technology Institute (CMTI) | PES University

Important Announcement

About the Conference

The triennial International Conference series on Smart Materials, Structures and Systems (ICSMSS) organized by the Institute of Smart Structures and Systems (ISSS) began in 1996 and is continuing since then. As a result of this, there has been a spurt of activity in India in the area of Smart Structures and Systems in general and Micro-Electro-Mechanical Systems (MEMS) in particular.

National Programme on Smart Materials (NPSM) and the National Programme on Micro and Smart Systems (NPMASS) funded by the Govt. of India has facilitated product-oriented research in India in many areas of interest to ISSS. The evolution and maturing of these research and developments are clearly seen over the years. The ICSMSS2020 conference, which is the ninth in the triennial conference series, will continue to extend this evolutionary thread and will aim to provide a forum to academicians, researchers and technologists to not only assess the current status in these technologies but also to steer towards a more effective utilization of these technologies.

The ICSMSS2020 conference is jointly organized by ISSS, Indian Institute of Science (IISc). Central Manufacturing Technology Institute (CMTI) and PES University are co-organizers of this event that will be held at the campus of PES University, Bengaluru.

General Topics

Multiphysics: Theoretical and computational advancements and industrial applications of mechanics, acoustics, electromagnetics, magnetics, electrics, fluidics, chemistry, thermodynamics, structures, materials science, biology, etc.

Fabrication technologies: Tools, processes, and materials, vacuum technologies, new fabrication and integration techniques for both silicon and non-silicon materials, top-down and bottom-up approaches, low cost approaches, packaging.

Electronics: Integration of interface circuits with micro-and nano-scale devices, reliability and sensitivity enhancement.

Bio-nanotechnology: Bio-photonics, microfluidics, lab-on-chip, bio-mechanics, bio-manipulation.

Sensing and actuation: Electric, magnetic, acoustic, electromagnetic, infrared, optical, chemical, inertial, mechanical, biological etc.

Smart Materials: Conducting, electroactive or chiral polymers, smart ceramics, smart composites, memory materials, energy harvesting materials, micro-and nano-structured materials, self-assembled materials, liquid crystals, biomaterials, etc.

Smart Structures & Control: Smart aerospace structures, civil infrastructures, transportation vehicles, structural acoustic control, real-time implementation, stability of adaptive structures, morphing structures, energy harvesting structures, self-sensing and self-healing structures, human-machine communication and control interfaces.

Structural Health Monitoring: Damage assessment, alleviation, and health monitoring of composites, aerospace structures, civil infrastructures and transportation vehicles, structural health monitoring system design, verification and validation.

Applications: Smart materials and sensors in defense, agriculture, aerospace, automobile, biomedical, wearable, IoT and photonics industries; Field implementations of sensor networks; RF MEMS switches, phase shifters, reconfigurable antennas; MOEMS, tunable optics integrated optics, optical fibre technology; energy harvesting devices.

Authors can submit papers in any of the following general sessions or the focused sessions.

General Sessions

- Artificial Intelligence and Machine Leaning
- Autonomous vehicle, navigation, guidance and control
- MEMS, MOEMS, Optoelectronic and Microfluidic Devices
- Smart, Multifunctional Materials and Structures
- Structural Health Monitoring and NDE

Special/Focus Sessions

Following focus sessions will be organized in line with the thematic areas of 2020 conference.

Sensors for IoT

Topics include

- Industrial IoT sensors and sensing algorithms
- Device design, reliability, deployment and maintenance strategies
- System architecture, scalability
- Communication technologies
- High-level data analytics
- Applications in agriculture, healthcare, smart mobility, robotics and automation, supply chain, smart cities, space and defence

Smart Manufacturing

Topics include

- Emerging tools and technologies for 3D printing
- Advanced composite manufacturing processes and tools for aerospace and defence
- Repair technologies
- Flexible, reconfigurable manufacturing
- Smart factory, process planning, optimization and automation
- Manufacturing inspection, quality assurance and quality control

Photonics

Topics include

- Nano-Photonics, photonic crystals and waveguides
- Optoelectronic materials and phenomena
- Semiconductor laser and LED
- MOEMS and MEMS in photonics
- Photonics in microfluidics
- Photonic integration in devices
- Optoelectronic communications
- Displays, holography, multispectral and multimodal imaging
- 3D Printing

Wearable technologies

Topics include

- Medical implants, prosthetics
- Artificial organs, materials and optoelectronics for regenerative medicine
- Flexible electronics
- Biocompatible, biodegradable and naturalized materials and electronics for implants and wearable devices
- Sensor network for system-level monitoring and analytics

- Communication technologies
- Mobile and smart phone centric sensing techniques and devices
- Haptics, multi-objective, close-loop and cognitive sensing, actuation and control
- Human capability augmentation using wearable devices
- Augmentation of health monitoring and predictive capabilities

List of Confirmed Plenary/Keynote and Invited Speakers

Vijay Varadan, Pennsylvania State University (USA)
Srinivasan Chandrasekhar, Purdue University (USA)
Sunil K. Agrawal, Columbia University (USA)
Perumal Nithiarasu, Swansea University (UK)
Siddhartha Mukhopadhyay, Indian Institute of Technology Kharagpur (India)
Asim Tewari, Indian Institute of Technology Bombay (India)
Ayech Benjeddou, Supméca (Paris) & UTC/CNRS Roberval Lab, Compiègne, (France)
Dheepa Srinivasan, Pratt & Whitney (India)
Ravi Selvaganapathy, McMaster University (Canada)
Yoji Okabe, University of Tokyo (Japan)
Aditi Chattopadhyay, Arizona State University (USA)
Ravi Panwar, Indian Institute of Information Technology, Design & Manufacturing, Jabalpur (India)
Sauvik Banerjee, Indian Institute of Technology Bombay (India)
Kanwar Pal Singh, Max Planck Institute for Science of Light (Germany)
Apparao Rao, Clemson University (USA)
Gopalkrishna Hegde, Indian Institute of Science (India)
Mira Mitra, Indian Institute of Technology Kharagpur (India)

Mentoring Session: A mentoring session for students will be organized where a student participant will be paired with a senior researcher before the conference event. They will meet to discuss mentee's career options and discuss on a topical problem in a one-on-one setting during the conference, as previously organized by ISSS successfully.

Design Contest: A smart system design contest will be held at the conference. (please visit website for further details).

Industry Panel: Industry experts will be invited to join panels to discuss and share their views and ideas on various issues and future directions on the thematic areas of IoT, Smart Manufacturing, Wearables Technologies and Photonics.

Smart Systems in Action: Student team and Start-ups are invited to demonstrate their invention/product in action. The session will be a single-track event where each

team will demonstrate their invention/product in 15 minutes and the event will be broadcasted live on the internet. (please visit website for further details).

Award Session: ISSS Annual Student Awards Contest will invite shortlisted student participants to present their paper. There will be also best paper and best poster awards. Best Smart System in Action and best Smart System Design will receive awards.

Masterclass Lectures

There will be several Masterclass Lectures organized at the campus of organizing institutions for advanced level graduate students and junior researchers. Following Masterclasses are planned to be offered by the senior researchers, teachers and industry experts who are also speaking at the main conference. These will be followed by ISSS Foundation Courses which will be a 30 hours long course after the conference. Separate registration fee will be required for attending Masterclass Lectures and Foundation Courses. Please visit the conference website for more details.

Masterclass Topics

- **Smart Mobility, Smart Infrastructure & IoT**
  Speakers:
  Siddhartha Mukhopadhyay, Indian Institute of Technology Kharagpur (India);
  Bharadwaj Amrutur, Robert Bosch Centre for Cyber Physical Systems, Indian Institute of Science (India)

- **Smart Manufacturing**
  Speakers:
  Srinivasan Chandrasekar, Purdue University (USA);
  Perumal Nithiarasu, Swansea University (UK);
  Asim Tewari, Indian Institute of Technology Bombay (India);
  Dheepa Srinivasan, Pratt & Whitney (India)

- **Biosensors and Wearable Technologies**
  Speakers:
  Sunil K. Agrawal, Columbia University (USA);
  Ravi Selvaganapathy, Mc Master University (Canada)
  Dipti Gupta, Indian Institute of Technology Bombay (India)

- **Structural Health Monitoring & NDE**
  Speakers:
  Ayech Benjeddou, Supméca (Paris) & UTC/CNRS Roberval Lab Compiègne (France);
  Sauvik Banerjee and S. Tallur, Indian Institute of Technology Bombay (India);

Christian Boller, Univ. Saarland (Germany)
Mira Mitra, Indian Institute of Technology Kharagpur (India)
Rohan Soman, Institute of Fluid-Flow Machinery, Polish Academy of Science (Poland)

For registration fees for the Masterclass refer the Conference Registration section.

Conference Format

There will be Plenary/Keynote Lectures, Tutorials, Invited Talks and Industry Panels specially formulated by the Technical Program Committee to ensure an intellectually benefitting experience for the participants. All contributed papers will be presented as short presentations followed by an optional interactive/poster session. The presentation format will be communicated to the authors of the selected contributed papers. All the presenters will have chance to publish their presentation via video recording optionally.

Public Lecture

A public lecture on a contemporary topic will be included as part of the conference program, and it will be open for the general public. Attendees of the event are welcome to register for the conference or become members of ISSS. The speaker and topic will be announced at the conference website.

Awards & Felicitations

ISSS encourages students, young scientists and technologists by giving them special annual awards. Please visit the ISSS website for more details and guidelines for nomination.

About the Organizers

Institute of Smart Structures and Systems (ISSS)

Institute for Smart Structures and Systems (ISSS) was registered as a technical society under the Government of Karnataka State of India, to promote the Science and Technology of Smart materials and Systems, MEMS and related areas. ISSS organizes triennial international conferences and annual national conferences, which are the major events providing the platform for dissemination of knowledge and information among the practitioners of Smart Systems technologies. ISSS also conducts training workshops for teachers of engineering educational institutions across the country. ISSS started a biennial technical journal in 2012 which is co-published with Springer Nature since 2017.

Indian Institute of Science (IISc)

Established in 1909, IISc is India's leading institution of advanced education and research in the sciences and in engineering. From its beginnings, IISc has laid equal emphasis on fundamental investigations and the solution of practical problems. The faculty of around 500 carries out research across 42 departments in most areas of the basic and applied sciences, publishing vigorously in premier journals. With some of the best students in the country seeking entry into IISc, the Institute ensures that these students are exposed to a strong research training and pursue cutting edge research. IISc has a vibrant and diverse campus in the city of Bengaluru, India's hub of high-technology companies (in aerospace, electronics, and information technology), educational and research institutions, and numerous start-ups.

Central Manufacturing Technology Institute (CMTI)

CMTI is a Research & Development organisation focusing on providing Technology Solutions to the manufacturing sector and assisting technological growth in India. CMTI plays a key role in applied research, design and development, technology forecasting, assimilation and dissemination of manufacturing technology to Indian industries. CMTI is an autonomous institution under the Ministry of Heavy Industries & Public Enterprises, Government of India, governed by a Governing Council which has representation from the machine tool manufacturing and user industries, the Union Government and the State Government of Karnataka. CMTI over the last five decades developed special purpose machines, inspection systems, test rigs for qualification testing of products, tooling, complex machined parts for public and private sectors. CMTI has continuously aligned its facilities and expertise with the fast-changing technology in thrust areas of manufacturing to support and serve the manufacturing sector. Nanotechnology, Precision engineering, Metrology (Micro and Nano), Additive Manufacturing, Mechatronics, Vision and Image processing, Digital Design, Product Lifecycle Management (PLM) and Human Resource Development are the current areas of focus of the Institute.

PES University

Peoples Education Society (PES) founded in the year 1972 has strived incessantly for imparting quality undergraduate and graduate education in the fields of science, medicine, engineering and management. The infrastructure, faculty and teaching-learning processes are in sync to make the student capable to the future pursuits of life. The unwavering commitment to the quality education in PES Institute of Technology (PESIT) facilitated easy evolution of PES University as a state private University in the state of Karnataka, India in 2013. PES University has a green campus located right in the heart of Bangalore, providing numerous location-based advantages. In a short span of 5 years since its inception, PES University has achieved the recognition of the number one University from KSURF in the category of young Universities (under 5 years) for two consecutive years.

Conference Patrons

V.K. Aatre, Indian Institute of Science; Former Scientific Adviser to Defence Minister, Govt. of India; Founder President ISSS
M.R. Doreswamy, Chancellor, PES University
Jawahar Doreswamy, Pro-Chancellor, PES University

General Committee

Conference Chair
A.R. Upadhya, Former Director, CSIR-National Aerospace Laboratories; Vice-Chairman NALTech-CSIR; Distinguished Professor, JAIN University
Conference Co-chairs
Nagahanumaiah, Director, Central Manufacturing Technology Institute
S. Mohan, Indian Institute of Science
J. Suryaprasad, Vice-Chancellor, PES

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V. Natarajan, Research & Innovation Centre (DRDO), IIT Madras
Veda Nagaraj, Nitte Meenakshi Institute of Technology; Secretary ISSS
Vidyashankar Buravalla, GE Global Research Centre; Vice-President ISSS

Organizing Committee

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B. Rammohan, PES University

Organizing Committee Secretary
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K.S. Sridhar, PES University

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Suresh Sundaram, Indian Institute of Science

Technical Committee Members
Alok Srivastav, U R Rao Satellite Centre, ISRO (India)

Ayech Benjeddou, Supméca, Paris & UTC/CNRS Roberval Lab, Compiègne, (France)

Amit Agrawal, Indian Institute of Technology Bombay (India)

Arvind Ajoy, Indian Institute of Technology Palakkad (India)

B. K. Keshavan, PES University (India)

Chandrashekhar Bhat, Manipal Institute of Technology (India)

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Dipak Kumar Maiti, Indian Institute of Technology Kharagpur (India)

Enakshi Bhattacharya, Indian Institute of Technology Madras (India)

Gopalakrishna M Kamath, Indian Institute of Technology Kanpur (India)

Gopalakrishna M Hegde, Indian Institute of Science (India)

K.V. Gangadharan, National Institute of Technology Karnataka (India)

K. Vijayaraju, Aeronautical Development Agency (India)

M.S. Giridhar, Laboratory for Electro-Optic Systems, ISRO (India)

P. Ravi Selvaganapathy, McMaster University (Canada)

Prakash Vinod, Central Manufacturing Technology Institute (India)

Prita Nair, SSN College of Engineering (India)

Revathy Padmanabhan, Indian Institute of Technology Palakkad (India)

S. Raja, CSIR-National Aerospace Laboratories (India)

Saptarshi Sasmal, CSIR-Structural Engineering Research Center (India)

Sambuddha Khan, Metal Power Analytical-Mumbai (India)

Samudra Dasgupta, Aeronautical Development Establishment, DRDO (India)

Sauvik Banerjee, Indian Institute of Technology Bombay (India)

Shivaram Chandrashekar, Applied Materials (India)

Suman Kapur, Birla Institute of Technology & Science, Pilani (India)

Suresh Bhalla, Indian Institute of Technology Delhi (India)

Subhasish Mohanty, Argonne National Laboratory (USA)

V. L. Sateesh, CSIR-National Aerospace Laboratories (India)

V. Shanmugaraj, Central Manufacturing Technology Institute (India)

Paper Submissions

Prospective authors are requested to submit contributions through the online submission portal EDAS [edas.info]. Articles should be submitted in a prescribed camera-ready format and should highlight important technical contributions to enable a decision on its acceptance. There is a page limit of maximum six pages.

Please visit the conference website to find out the detailed requirements regarding paper submission and publication policies related to copyright and plagiarism. The acceptance will be based on the peer review of the manuscript and the decision of the Technical Program Committee will be communicated to the corresponding author. Subsequent to acceptance of the manuscript, final manuscript in pdf format should be submitted through EDAS portal. At least one of the authors should be registered by the early bird registration deadline, for the inclusion of the paper in the

Conference Proceedings. An e-proceedings of the conference containing all accepted full-length papers are planned to be made available to the conference participants.

Special Issues in Journal

Authors of all papers who presented their work at the conference will be given an option to submit their full-length paper in one of the following journals:

- Special Issues of ISSS Journal of Micro and Smart Systems (Co-published by Springer Nature).
  Journal website: https://www.springer.com/journal/41683
- Manufacturing Technology Today (UGC approved monthly e-Journal published by CMTI, ISSN: 0972-7396).
  Journal website: https://www.cmti-india.net/?q=MTT%20Journal

Conference Registration

	Early Bird Registration (May 15, 2020)	Late registration (June 30, 2020)	On-site Registration
Individual*	INR 8000	INR 10000	INR 12,000
Group of 4 or more from the same organization (per participants)	INR 6000	INR 8000	INR 10,000
Students*	INR 2000	INR 2500	INR 3000
ISSS Life Members	INR 6000	INR 8000	INR 10,000
Student Members of ISSS	INR 1500	INR 2000	INR 2500
Masterclass Registration Fee	INR 2000	INR 3000	Closed

* Registrants of the conference will be offered one-year free complimentary annual membership of ISSS if they submit the Application for Membership onsite at the conference or earlier. They will be able to upgrade to the Life membership of ISSS by paying an additional fee of Rs 5000 along with the Application for Membership.

The registration fee includes a copy of the conference proceedings, dinners, working lunch, tea/coffee on all conference days. All authors who are presenting papers are expected to register for the technical sessions. The above list does not include special fees for various tutorials/workshops. Please note that separate registration fees will be payable for Masterclass Lectures and Foundation Courses.

Special Academic Package: As a special gesture to academia we have introduced a Special Academic Package of INR 15,000 for a group of six students and a teaching faculty member, if any. Please see the conference website for additional details. Any bank commission or other charges should be included in the amount of the draft in addition to the Registration Fee. Delegates outside India should make

payments through International Bank Draft payable at par at Bangalore. Delegates from India should make payments through crossed bank draft/pay order/cheque/online transfer payable at par at a bank in Bangalore. The registration fee cannot be refunded/adjusted against other participants.

Sponsorships & Exhibits

ISSS seeks financial support from various funding agencies, industry participants in categories such as Platinum, Gold and Silver sponsorships. Sponsors' details will be displayed at the venues, banners, and various publications related to the event. They will also be given preferential allocation of exhibition space at the conference venue, according to category.

Platinum Sponsor: (INR 500,000): 10 complimentary registrations. Two exhibition stall measuring 3mx3m (approx.) at a premium location, Mention in all publications and major displays at the venue; and two pages in Souvenir/Book of Abstracts.

Gold Sponsor: (INR 300,000) 5 complimentary registrations. One exhibition stall measuring 3mx3m (approx.), Mention in all publications and major displays at the venue, and a page in the Souvenir/Book of Abstracts;

Silver Sponsor: (INR 150,000) 2 complimentary registrations. One exhibition stall measuring 3mx3m (approx.), Mention in all publications and major displays at the venue; Half page advertisement in the Souvenir/Book of Abstracts.

Exhibition stalls will be distributed on a first-come first-served basis. However, high category of sponsorships will be given preference. Please note that the conference organizers reserve the right reassign booths in consultation with the affected parties, in case of unforeseen situations.

Other General Information for Potential Sponsors: The names and/or logos of confirmed sponsors will appear in the conference website till the end of the conference. These will also appear in all publicity materials banners for the conference. In addition, opportunities will be provided to include advertisements in the Conference souvenir.

Industries/organizations are invited to showcase their products during the conference. Exhibition stalls measuring 3mx3m (typical) will be provided to those supporting the conference. Please contact the organizers by e-mail to icsmss.info@gmail.com for additional details.

Contact e-mail:

General information, sponsors/exhibit, travel, accommodation: icsmss.info@gmail.com

Conference registration: icsmss.reg@gmail.com

Paper submission, technical program related: icsmss.papers@gmail.com

Conference website: www.isssonline.in/icsmss2020

Past Conferences

Since the first international conference which was held in 1996, ISSS ICSMSS events had been organized in Bangalore city in and around Indian Institute of Science campus. The conference has consistently attracted approximately 250 participants including significant number of participants from international academic community and industries, plenary talks and keynotes by distinguished speakers besides workshops in different areas related to smart systems.