



# TRIBOINDIA 2021

An International Virtual Tribology Conference

**Theme: Tribology for Sustainable Environment and  
Industry 4.0**

**02 – 04 December, 2021**

**Organized By**

**Department of Mechanical Engineering  
Saintgits College of Engineering (Autonomous)  
Kottayam, Kerala – 686532, India**



**Under the Aegis of Tribology Society of India (TSI)**



**Tribology Society of India**

(Affiliated to the International Tribology Council, UK)

## TRIBOINDIA 2021

Tribology is a multi-disciplinary field of science and technology dealing with the study of interacting surfaces in relative motion and of related subjects and practices. The term, derived from the Greek word “**Tribos**” (meaning “**Rubbing**”), in general denotes the subject of Friction, Lubrication & Wear technology. Over the years, the subject of Tribology came to be recognized as a very important aspect in all industrial operations. The application of correct Tribological practices can protect and enhance the life of plants and machinery, improve efficiency of operations, reduce energy consumption and prevent expensive breakdowns.

To provide a common umbrella to work further in this area, **Tribology Society of India (TSI)** has been set up as a premier professional, not-for-profit body bringing together academicians, and industry as well as research organizations as its members. The Society is affiliated to the International Tribology Council (ITC) based in London, UK. The activities related to Tribology in the country started way back in 1972, when First World Conference on Industrial Tribology (WCIT) was organized by Indian Institute of Technology at New Delhi. Continuing with this, a series of National and International Conferences have been organized during last 49 years including successful recent events like ASIATRIB 2014, TRIBOINDIA 2018 (4<sup>th</sup> in the series of National Tribology Conferences) and IndiaTrib – 2019 (the 10<sup>th</sup> International Conference on Industrial Tribology at IISc, Bangalore). TSI also organizes its annual event of Summer School in Tribology, the recent one being the 13<sup>th</sup> Summer School in Tribology, in webinar mode having been organised successfully during August - September 2021. Currently, the Society operates from its registered office at Indian Oil R&D Centre, Faridabad. Tribology Society of India invites academic institutions to organize a conference once in every 2 years with the sole objective of providing a platform to academicians, researchers and practicing engineers to discuss the current trends in tribology practices.

**TRIBOINDIA 2021 is the Sixth in the series of National Tribology Conferences (NTC)**, however the second ever through online mode. The first edition of NTC was organized by IIT Roorkee in 2011, the second one at PES University at Bengaluru in the year 2014 and third one at IIT BHU, Varanasi during 2016. In 2018, the NTC was renamed as **TRIBOINDIA** and was organized at VJTI Mumbai. SRM Institute of Science and Technology, Chennai organized the fifth edition through online mode. This year **Saintgits College of Engineering (Autonomous), Kottayam, Kerala** will be organizing the **TRIBOINDIA 2021 via online mode as an International Conference**.



## About Kottayam, Kerala, India

Flanked by the lofty and mighty Western Ghats on the east, and the Vembanad Lake and paddy fields of Kuttanad on the west, Kottayam is a place that is known for extraordinary qualities. The city is situated near the inland estuary of Meenachil River where it empties into the Vembanad Lake (Backwaters) in Kumarakom. Kottayam is also called as “Akshara Nagari” which means the “City of Letters” considering its contribution to print media and literature. Kottayam Town is the first town in India to have achieved 100% literacy (a remarkable feat achieved as early as in 1989). The city is an important trading center of spices and commercial crops, especially rubber.



## About Saintgits College of Engineering (Autonomous), Kottayam

Right from inception, the college has been maintaining high levels of standards in academic and extra-curricular realms of activities. The primary focus of the institution is to expose the young minds to the world of technology, instilling in them confidence and fortitude to face new challenges that enable them to excel in their chosen fields. The college offers B-Tech Degree course in 9 engineering disciplines, and Master’s Degree courses in Engineering, Computer Applications and Business Administration. In the short span of 19 years of its existence, the college has bagged several university ranks and has a remarkably high percentage of pass. The college is also the venue of several national and state level seminars, conferences and symposia and has emerged as the hub of technical education in the state of Kerala. Saintgits College of Engineering has been granted Autonomous status by the University Grants Commission (UGC), making the institution one among the first three Engineering Colleges in Kerala to achieve this coveted status. The college is affiliated to APJ Abdul Kalam Technological University, Thiruvananthapuram. Further, Saintgits is the only unaided institution in Kerala accredited by the National Board of Accreditation (NBA) for 7 programmes.



## About Department of Mechanical Engineering, Saintgits

The Department offers UG programme in Mechanical Engineering and PG programme in Machine Design and is recognized for doctoral research by the Parent University. The Department has experienced faculty and well established laboratories and liaison with reputed industries and R & D organizations. The association with California Institute of Technology (Caltech), Pasadena, USA, proves the mettle of the Mechanical Engineering Department. Moreover, the UG program run by the Department is certified with NBA Accreditation till 2022, which stands as one of the honours of the Department for providing quality based education.

## Objectives of TRIBOINDIA 2021

The name “**Tribology**”, denoting friction, lubrication and wear related studies, was coined by Late Prof. H Peter Jost in the year 1966. Importance of tribology for sustainable environment and reliability cannot be over emphasized. It is reported that loss due to improper understanding and application of tribology is over 1.5% of GDP of the developed countries like USA. We can well imagine the state of affairs in our country, where, awareness about importance, understanding and application of tribology is rather low. Tribological failures are responsible for over 40% of breakdowns in industries. Therefore, engineers working in the field need to have a thorough understanding of tribological practices, so that proactive measures can be implemented in place of traditional corrective and breakdown maintenance practices. In view of the above facts, the theme of the present international conference has been chosen as “**Tribology for Sustainable Environment and Industry 4.0**”.

The major objectives of the conference are:

- To disseminate the current fundamental concepts, practices, applications, opportunities and challenges in tribology
- To introduce and explore the various theoretical, experimental and computational methods for research in tribology as a tool for improved efficiency and enhanced life of the machine components.
- To showcase the advancements in lubrication, coatings, bearings, surface engineering and wear resistant materials.
- To discuss the emerging fields such as nanotribology, biotribology and space tribology
- To provide an opportunity to manufacturers to display their state-of-the-art tribo-equipment & products and services
- To apply tribology to enhance smart manufacturing techniques for better reliability and life
- To develop a sustainable environment using correct tribological practices

It is with this background that the Department of Mechanical Engineering, Saintgits College of Engineering (Autonomous), Kottayam and Tribology Society of India (TSI) have joined hands to organize **TRIBOINDIA 2021 – An International Conference in virtual mode during 02-04 December, 2021** at our prestigious institution to reinforce the need for continued education in Tribology - an interdisciplinary science and technology of friction, wear and lubrication.

### Call for Papers

Original research contributions are invited from Scientists, Academicians, Research Scholars and Practicing Engineers in Tribology for technical sessions in the following areas mentioned in the next session (but not limited). Authors are also encouraged to submit their original articles to the supporting journals (will be notified later). Keep an eye on conference and TSI website.



## Scope of TRIBOINDIA 2021

**TRIBOINDIA 2021** will highlight various innovations, solutions and emerging technology trends in Tribology for enabling energy and life Improvements resulting in improved productivity and profitability in Industry. This conference, “**Tribology for Sustainable Environment and Industry 4.0**”, will have parallel technical sessions covering the following broad areas:

- Contact Mechanics: Experimental and theoretical studies
- Friction: Friction mechanisms at different scales, Friction materials
- Lubrication: Thin film lubrication, Lubricants & Additives
- Wear of Materials: Wear modelling and mechanisms, Wear resistant materials
- Bearing and Gear Tribology
- Surface Engineering: Tribo-corrosion, Surface treatments & coatings
- Tribology in Design and Manufacturing
- Automotive, Marine and Wind Power Tribology
- Tribology in Built Environment
- Tribology in Bio-medical Applications
- Tribo-testing and Advanced Condition Monitoring
- Tribology for Reliability and Life
- Industrial Application of Tribology and Case Studies
- Tribology in Artificial Intelligence (AI) and Machine Learning (ML)
- Special Topics: Green Tribology, Nanotribology, Biotribology, Biomimetics

## Proceedings and Journal Publications

The E-proceedings of the accepted manuscripts will be shared to all the registered participants. The conference committee has sought permission from a few of the leading journals in the field of Tribology to publish full manuscript. More details regarding this matter are available in next page and also through conference and TSI website.

## Important Dates

Last date for submission of abstract	: <del>10<sup>th</sup> November, 2021</del> <b>25<sup>th</sup> November 2021</b>
Notification of acceptance of abstract	: <b>27<sup>th</sup> November, 2021</b>
Submission of extended abstract	: <b>28<sup>th</sup> November, 2021</b>
Registration	: <b>28<sup>th</sup> November, 2021</b>

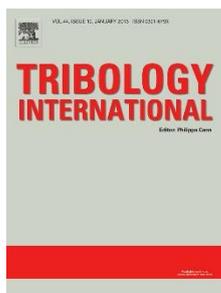
Prospective contributors are requested to submit the abstract of their paper in about **250 words for review and selection via online submission link given below at TSI website at the TRIBOINDIA 2021 icon**

<http://tribologyindia.org/online-abstract-submission-triboindia-2021.html>

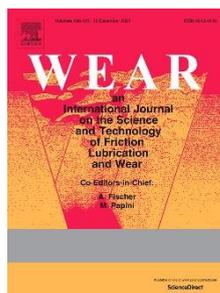
Authors of selected papers are required to submit extended abstract of their papers (up to 4 pages) latest by November 28, 2021. The guidelines for authors and template for the extended abstract will be available for download from the conference and TSI website.



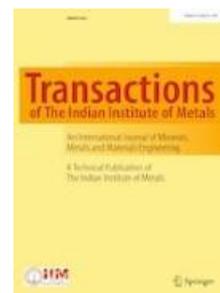
## Supporting Journals of TRIBOINDIA 2021



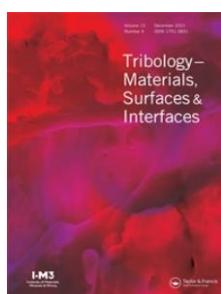
**Tribology International\***,  
**Elsevier**  
Indexed in: **SCI, Scopus**  
Impact Factor: **4.872**  
Issue: **Regular**



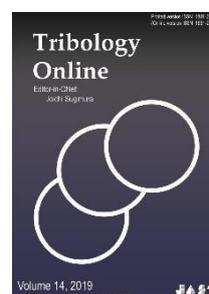
**Wear\***, Elsevier  
Indexed in: **SCI, Scopus**  
Impact Factor: **3.892**  
Issue: **Regular**



**Transactions of the Indian Institute of Metals\* , #**, Springer  
Indexed in: **SCI, Scopus**  
Impact Factor: **1.499**  
Issue: **Special Issue**



**Tribology - Materials, Surfaces & Interfaces\***, Taylor & Francis  
Indexed in: **ESCI, Scopus**  
Issue: **Regular**



**Tribology Online\***, Japanese Society of Tribologists  
Indexed in: **ESCI, Scopus, DOAJ**  
Issue: **Regular**

\*With acknowledgement to TRIBOINDIA 2021 with Abstract ID

#With Guest Editors from Organizing Committee of TRIBOINDIA 2021, Max. 30 papers

## Sponsors of TRIBOINDIA 2021



## Invited Speakers for TRIBOINDIA 2021

We have a galaxy of tribology experts who have confirmed their participation as Plenary and Keynote Speakers. These include:



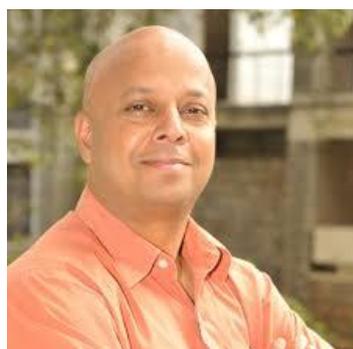
**Prof. Nicholas D Spencer**  
ETH Zurich Switzerland



**Prof. Hong Liang**  
Texas A&M University USA



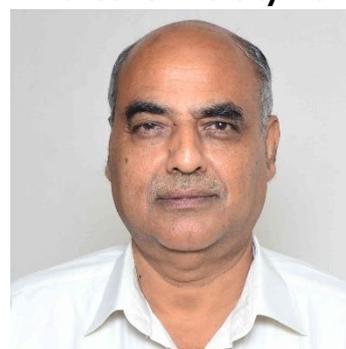
**Prof. Dae Eun Kim**  
Yonsei University Korea



**Prof. Satish V Kailas**  
IISc Bangalore



**Prof. A P Harsha**  
IIT Varanasi



**Prof. Satish C Sharma**  
IIT Roorkee



**Prof. Jayashree Bijwe**  
IIT Delhi



**Prof. Sujeet Kumar Sinha**  
IIT Delhi



**Prof. Prasanta Sahoo**  
Jadavpur University Kolkata



**Dr. O P Khatri**  
IIP Dehradun



**Dr. Nitya N Gosvami**  
IIT Delhi

More speakers will be added shortly.....

## Registration Fee

Category	Registration Fee *
Student Delegate	INR 600/-
Academic Delegate	INR 1800/-
Industry Delegate	INR 2400/-
Foreign Delegate	USD 60
Foreign Delegate – Student	USD 30

\* All the above fee are inclusive of GST.

At least one author needs to be registered for presentation. Registered delegates and presenting authors will be provided E-certificates and E-proceedings. For further details, please keep visiting the website of conference and TSI.

**For online registration, please use the link given below at the TRIBOINDIA 2021 icon at TSI Website**

<http://tribologyindia.org/online-registration-form-triboindia-2021.html>

## Payment Details

All payments related to Delegate Registration Fee, Sponsorship, Advertisements, Technical Exhibition and Manufacturer's Presentation are to be made through crossed demand draft drawn in favor of "Tribology Society of India" payable at State Bank of India, IOC Complex Branch Faridabad **OR** by Bank Transfer to the following bank account:

Beneficiary : **Tribology Society of India**  
 Beneficiary A/c No. : **31710524711**  
 Bank Name & Address : State Bank of India, IOC Complex, Sector 13, Faridabad  
 IFSC Code: **SBIN0010449** SWIFT: **SBININBB383** MICR Code: **110002466**

## Business Presentation

Manufacturers/suppliers of equipment, lubricants, additives and service provider related to Tribology would be invited to Conference to project their products/services/innovations through multimedia presentation in the special sessions in Manufacturer's Presentation. A nominal fee of Rs. 12,000/- (including GST 18%) would be charged for each presentation of 20 minutes duration for business presentation. One slot free of charge will be provided to all Platinum and Diamond sponsors.

## Conference Sponsorship Details

The Conferences organised by TSI in the past have always received significant support from various industries. These include practically every industry sector like Oil & Gas, Steel, Mining, Chemicals, Power, Engineering and Allied Industries, both from India and Abroad. The sponsors get wide publicity and networking opportunities as part of the Conference. Reputed Companies, Organisations and Trade Associations are invited to join this International Event as Sponsors of the Conference. The details regarding various categories of sponsorship are given below.

Category	Indian	Foreign
Platinum*	Rs. 50,000 <sup>#</sup>	USD 625
Diamond**	Rs. 25,000 <sup>#</sup>	USD 315

\* **Title Sponsors (4 free delegates registration + One business meet presentation)**

\*\* **Display of Company Logo (2 free delegates registration + One business meet presentation)**

<sup>#</sup> **Excluding GST (GST 18%)**

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**Conference Website: <http://triboindia2021.saintgits.org/>**  
**TSI Website: <https://www.tribologyindia.org/>**



Host Institute Website: <https://saintgits.org/>