



**Auckland University of
Technology
New Zealand**



**SPARC Workshop
on**

Materials Tribology

November 08 & 09, 2024

**Venue: Department of Mechanical Engineering,
Indian Institute of Technology (IIT) Varanasi**

About SPARC:

Scheme for Promotion of Academic and Research Collaboration (SPARC) aims at improving the research ecosystem of India's Higher Educational Institutions by facilitating academic and research collaborations between Indian institutions and the best institutions in the world from 28 selected nations to jointly solve problems of national and/or international relevance.

Programme Overview:

Tribology is the study of contacting surfaces that are in relative motion. It's an interdisciplinary area that weaves together basic sciences like physics, chemistry, mathematics, and engineering fields, i.e., mechanical, chemical, and materials. Tribology can be felt almost in every walk of life, and it is now well established that energy and material loss due to friction and wear are tremendous burdens on the economy and environment. Approximately one-third of the world's primary energy consumption is attributed to friction; additionally, about 80% of the components in mechanical systems fail by wear caused by rubbing action at the interface. Even a slight improvement in the tribological behaviour of mechanical systems can reap enormous societal and economic benefits. Therefore, tribology has significantly contributed to materials, energy conservation and engineering innovation. Considering the subject's importance, the course will attract faculty, researchers, and students from different backgrounds.

Workshop objectives and topics to be covered

The workshop aims to disseminate knowledge of this critical scientific and engineering area, which has a bearing on the economy, environment and, ultimately, on the quality of human life. Furthermore, it brings together a broader scientific community of scholars and increases the collaborative research component. The focus of the workshop is on Bio-Tribology, High-temperature tribology, coating systems, biomimetic cartilage implants, Nano-tribology, triboelectric nanogenerators for energy harvesting, metamaterials with tailored frictional properties, and self-lubricating materials.

Resource persons / Speakers

Subject experts are from *AUT, New Zealand* and various IITs, CSIR Laboratory and R&D Labs.

- Prof. Maziar Ramezani, AUT, New Zealand
- Prof. Ramkumar P, Department of Mechanical Engineering, IIT Madras,
- Prof. Mayank Tiwari, Department of Mechanical Engineering, IIT Palakkad
- Prof. B. Venkata Manoj Kumar, Department of Metallurgical and Materials Engineering, IIT Roorkee
- Dr. Manjesh Kumar Singh, Department of Mechanical Engineering, IIT Kanpur
- Dr. Nitya Nand Gosvami, Department of Materials Science & Engineering, IIT Delhi
- Dr. Arvind Kumar Rajput, Department of Mechanical Engineering, IIT Jammu
- Dr. Om P Khatri, CSIR-Indian Institute of Petroleum, Dehradun
- Dr. Kartik Pondicherry, Anton Paar in Graz, Austria.

About International Expert Professor Maziar Ramezani, and AUT, New Zealand

Dr. Maziar Ramezani is a full professor in the Department of Mechanical Engineering at Auckland University of Technology (AUT), a leading New Zealand university renowned for its commitment to innovation and applied research. AUT's Department of Mechanical Engineering is well-known for its hands-on learning approach and strong focus on industry collaboration. As the Director of the Tribology and Surface Engineering Laboratory, Dr. Ramezani's research focuses on advanced manufacturing, material processing, and mechanical design. His diverse research portfolio spans additive manufacturing, composite materials, material deformation, and the design of orthopaedic implants. His work has contributed to developing improved materials, products, and manufacturing techniques for various applications. AUT is New Zealand's second-largest university, with a strong emphasis on research with real-world applications. The university fosters partnerships with industries and communities, allowing students to gain practical experience and contribute to innovative solutions. Dr. Ramezani's work aligns perfectly with AUT's vision of driving positive change through research

and education.

About the Indian Institute of Technology (BHU) & Department of Mechanical Engineering

Indian Institute of Technology (BHU) is one of the 23 IITs created to be Centres of Excellence for training, research and development in science, engineering and technology in India. The three colleges of Banaras Hindu University, namely BENCO, MINMET and TECHNO, were merged to form the Institute of Technology (IT-BHU) in 1968 to provide an integrated educational base. The IT-BHU has been admitting students through the JEE conducted by the IITs since 1972 and has been consistently ranked among the top ten engineering institutions in the country. IT-BHU became IIT (BHU) in June 2012 by an act of Parliament. The Institute was later declared an Institution of National Importance under the “Institutes of Technology (Amendment) Act, 1963” and was renamed as the “Indian Institute of Technology (BHU)”. Currently, the Institute comprises 11 Engineering Departments, 3 science Departments, 3 interdisciplinary schools and a humanities Department. These alumni today work as scientists, technologists, business managers and entrepreneurs. Several alumni have moved away from their original disciplines and have taken to administrative services, active politics or are with NGOs. In doing so, they have contributed significantly to building this nation and to industrialisation worldwide.

The Department of Mechanical Engineering is equipped with state-of-the-art infrastructure to conduct research in Coatings, Metal matrix composites, Friction & Wear assessment, Galling, bio-tribology, and Lubricants testing. The department has executed several research projects related to the above domain areas from funding agencies such as BRNS, DST, AICTE, DRDO etc. Faculty members collaborate with leading universities, laboratories, and institutes around the globe.

Whom the workshop will benefit?

The workshop will be delivered in face-to-face (offline) mode only. Interested faculty members /participants from academia (UG/PG students and research scholars from all disciplines)/Industry/ R&D lab can join the workshop at the Department of Mechanical Engineering, Indian Institute of Technology (BHU) Varanasi. There is no course fee/ registration fee to attend the workshop. However, all the participants must fill out a registration form showing their interest in attending the workshop. Upon receiving requests, efforts will be made to accommodate the student participants in the hostels. A maximum number of 40 participants will be allowed. The shortlisting of candidates will be done on a first-come, first-serve basis. The workshop completion certificate will be given to the participants. There will be a special session for research scholars to share their work in the workshop, either as a presentation or poster.

About Varanasi

The holy city of Varanasi is the oldest living city in the world, also known as the capital of the spiritualistic world. The city is of great historical and cultural importance. India's religious and cultural capital is situated at the bank of the holy river Ganges. It is famous for the temples of Lord Shiva, Buddha (at Sarnath) & Sankat Mochan etc. Varanasi is the premiere place of oriental learning and simultaneously keeping pace with modern advanced knowledge. This vibrant city with multiple dimensions of knowledge and liberation has a magnetic attraction for people worldwide.

Course Coordinators:

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Registration Link



<https://forms.gle/e7PCQ9CCYaEtpb3x7>