

**2nd International Conference on “Sustainable Technologies and Advances in Automation,
Aerospace, and Robotics” (STAAAR 2023)
15-16 December, 2023**

Preface

The 2nd International Conference on “Sustainable Technologies and Advances in Automation, Aerospace and Robotics (STAAAR 2023)” was held at VIT Bhopal University on 15-16 December 2023 in hybrid (online and offline) mode. This event strives to establish a leading cross-disciplinary platform to explore emerging innovations, prevailing trends and the complexities faced in the fields of Mechanical, Aerospace and Robotics.

The 2nd edition of STAAAR conference, in collaboration with South East Technological University (SETU), Ireland, and the Material Advantage student chapter of VIT Bhopal University, is a testament to the remarkable progress in Engineering and Technology witnessed in the last decade. This conference provides a crucial platform for researchers and scholars to showcase their pioneering work in various key areas such as Aerospace, Design, Materials and Manufacturing, Robotics, and Thermal Engineering.

Our prestigious Conference showcased a diverse lineup of speakers, reflecting the outstanding quality of the event. Over two days, we had the privilege of hosting 68 paper presentations across various sessions, each chaired by distinguished academic researchers from renowned institutions. It is encouraging to see significant participation from young researchers and scholars across the globe. Through a rigorous screening process, we diligently ensured that only high-quality papers were selected for publication in this proceedings.

The Conference Proceedings consist of 36 scientific papers divided into 4 topics as follows:

1. Materials Science and Manufacturing Processes
2. Design, Development, and Optimization
3. Advancements in Aerothermal Analysis
4. Robotics

We expect this publication, “Proceedings of STAAAR 2023,” to be helpful to researchers from both academics and industries.

Best regards,

Dr. Rohit Sharma, Dr. Shiv Manjaree Gopaliya, and Dr. Ashish Vashishtha
Editors

About the editors

Dr. Rohit Sharma is currently serving as an Assistant Professor and Programme Chair (Mechanical Engineering) at VIT Bhopal University, India. He earned his Ph.D. from Politecnico di Milano (POLIMI), Italy in Energy and Nuclear Science & Technology in 2017. His research focused on the near-field region of turbulent swirling jets in the combustion & propulsion laboratory. Notably, Dr. Sharma received an esteemed Erasmus Mundus fellowship sponsored by the European Commission in 2013 to pursue his Ph.D. Prior to his doctorate, Dr. Sharma received his M.Tech in Thermal Engineering from NIT Warangal in 2013 and a B.E. in Mechanical Engineering from LNCT Bhopal in 2010. Over the years, he has amassed extensive experience in the field of research and academia. For three years, he worked as a Senior Project Research Scientist at IIT Bombay. He also served as an Assistant Professor at NIT Jalandhar for some time, and gained invaluable industrial experience as a Graduate Engineer Trainee at Vardhman Yarns for one year.

Dr. Sharma has an impressive record of 23 publications in esteemed journals and conferences and has been honored with best research paper and poster awards. As a core team member, he actively participated in the student solar ambassador workshop organized under the SoULS project at IIT Bombay, which achieved the Guinness World Record on 2nd October 2018 for lighting the most LED lights based on solar energy. He has contributed to other sponsored projects such as the Energy and Economic Growth (EEG) project in collaboration with the University of California, Berkeley, USA, and Lawrence Berkeley National Laboratory, Berkeley, USA. Also, he worked on the TATA Research project in collaboration with Boston College, USA, under the SoULS, IIT Bombay umbrella. He has recently been awarded an International Travel Grant (2022) in the Young Scientist category and a Seminar/Symposia Grant (2023) by SERB, Department of Science and Technology, Government of India, serving as the Principal Investigator. He has traveled to numerous countries, including France, Greece, Italy, Poland, Portugal, Saudi Arabia, Switzerland, and the United Kingdom, to present his research at various international conferences. His diverse research interests encompass Experimental Fluid Dynamics, Optical Diagnostics, Flow Visualization, Internal Combustion Engines, Proper Orthogonal Decomposition, Predictive Modelling, and Sustainable Energy for Rural Development.

Dr. Shiv Manjaree Gopaliya is presently serving as Assistant Professor and Program Chair (Mechanical Engineering with specialization in Artificial Intelligence and Robotics) at VIT Bhopal University. Dr. Gopaliya has served in various academic and administrative positions at various academic Institutes for more than 15 years. Apart from her teaching commitments, she has successfully completed Government and industry-sponsored research projects both. She has one patent published to her credit. She has also served as Audit Coordinator for various Accreditation bodies namely, NBA, NAAC, IQAC to name a few. Dr. Gopaliya holds a Ph.D. in Robotics Engineering and M Tech in Robotics and Automation from Maharishi Dayanand University, Rohtak, Haryana. She is a Mechanical Engineering graduate from Government Engineering College, Jagdalpur, Chattisgarh. She is an active researcher in the area of the application of Artificial Intelligence in Robotics with a good number of publications in journals of

repute. Her research areas are Robotics Engineering, Application of Artificial Intelligence, Mechatronics, Instrumentation and Control Engineering. She is a life member of The Robotics Society and life members of SAE and Aeronautical Society of India. Presently, She is also handling the position of Convener, Women Empowerment Cell at VIT Bhopal University.

Dr. Ashish Vashishtha is currently working as PI and Lecturer at the Department of Mechanical and Aerospace Engineering, Faculty of Engineering, South East Technological University Carlow Campus, Ireland. He received his PhD from the Department of Advanced Energy, The University of Tokyo, Japan in the domain of Hypersonic Aerothermodynamics, and completed his postdoctoral research in hypersonic (at Indian Institute of Science Bangalore, India) and gas turbine combustion (University of Galway, Ireland). Prior to his PhD, he had 4.75 years of experience in an automotive industry (Renault-Nissan in India) in the domain of IC Engine combustion modeling and completed his master's research in experimental supersonic flows at IIT Kanpur. After joining SETU Carlow, he expanded his research interest in various applied domains of renewable energy (hydrogen, waste-to-synthetic fuel technologies, offshore wind turbines, IC-Engines/gas-turbine engine combustion, fuel flexibility), high-speed propulsion (hypersonic air breathing engines, space systems, green propellants for rockets as well as emerging coating, repair and additive manufacturing technology of Cold Spray and received funding of €1.5 million in past 4 year. He is actively involved in various professional societies, such as: Senior Member of AIAA, Member of Royal Aeronautical Society, Combustion Institute (Irish Section), EASN (European Aeronautics Association), Interstellar Research Group (IRG), International Shockwave Institute, Cold Spray Club, also member of COST Action 20127, Waste refinery Technologies for sustainable energy processes.