



The first issue of the year 2016 guest edited by Professors **Gopalan Jagadeesh**, Aerospace Engineering and **Gopalkrishna Hegde**, CeNSE of IISc is placed before you. The Journal Editorial Committee appreciate both the Guest Editors in bringing out this issue on '**Advances in Flow Diagnostics**' inviting review articles by the eminent authors in this area.

The articles span several discreet areas in flow diagnostics spanning both basic and applied aspects. The first review on Non-Intrusive Flow Diagnostics for Aerospace Applications outlines flow diagnostics, fluid mechanics and aeroacoustics. Tunable Diode Laser Absorption Spectroscopy as a Flow Diagnostic Tool is the topic discussed in the second article illustrates the fundamentals, operating principle, and applications including the scope of the technique in high speed flow research. Planar Laser Mie Scattering (PLMS) imaging technique forms the theme of the third review, while Fiber Bragg Grating (FBG) sensors and its application for dynamic tests in wind tunnels are discussed in the next article. Two major developments in the area of Shock Waves form the theme of the remaining two articles. The former one is on the study of using chemical reactions as a module to measure temperatures of reflected shock waves and the latter deals with the time resolved digital interferometry for high speed flows.

I extend my sincere thanks to Gopalkrishna Hegde and Gopalan Jagadeesh for Guest Editing Vol. 96 No. 1 of the Journal of the Indian Institute of Science and all the authors for their valuable contribution towards the successful completion of this issue. My special thanks to the editorial team who as always put in an enormous effort to get the articles ready for publication.

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Advances in Flow Diagnostics

Visualization techniques in high speed flows are used to reveal flow patterns for better understanding of complex, yet fascinating flow dynamics in a wide variety of situations. With the advent of digital image processing and advanced optical flow diagnostic methods have transcended to non-intrusive tools for gathering quantitative field information on the flow. The challenges are exacerbated at high speed flows where capturing flow phenomena at high spatial and temporal resolutions demand optical diagnostics working at their limits. Optical imaging techniques have played a major role in the investigation of a wide variety of fluid flows, providing high clarity qualitative images. Powerful computation methods further facilitate the quantification of important fluid mechanical properties including temperature, pressure, velocity, density and species concentration of the flows. Now it has become routine to use such images for comparison with numerical simulations, mainly CFD results, leading to a better understanding of the characteristics of the flow. Non-invasive techniques offer the greatest promise to get detailed information about flows in a wide variety of situations.

In view of these developments in flow diagnostic techniques in recent years, we planned this issue containing review articles in the area written by experts in their respective fields. In this issue, articles on non-intrusive flow diagnostics, diode laser absorption spectroscopy, planar laser Mie scattering technique, fiber optic sensor, digital interferometry and chemical reaction methods are included. The purpose of bringing out this issue is to give an overview of the recent developments in high speed flow diagnostic techniques.

We would like to thank Chief Editor Prof. T.N. Guru Row and the editorial committee of the journal for providing us this opportunity as guest editors for this issue. We are grateful to all the authors for contributing to this issue inspite of their busy schedule and our short notice. We would like to express our gratitude to Mrs. Kavitha Harish, and we would also like to thank AE Dept. and CeNSE for continuous support. Finally, we thank all the reviewers, copy editors and proof readers for their timely contributions towards bringing out this issue on time.



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