

Microelectromechanical Systems (MEMS)

FOREWORD

As a field, Microelectromechanical Systems (MEMS) has matured over the last two decades to have several scientific journals dedicated to it. These journals are instrumental in bringing out the interdisciplinary nature of research that the field demands. In the beginning, most papers were process centric where realization of a MEMS device or structure using conventional CMOS processes or their variants was the centre of excitement. Slowly, that excitement gave way to development of new materials, new processes, finer structures and new devices. Once the fabrication processes got established and commercial MEMS foundries came into existence, the focus shifted to MEMS design and system development. After the launch of a few commercially successful MEMS devices, the research focus has shifted to exploration of vast areas of applications. Application areas have started creating their own segments of MEMS research and it has become common today to see international conferences dedicate sessions to Bio MEMS, Optical MEMS, Inertial MEMS, RF MEMS, and the like. As more and more researchers join the fray, the overlapping research areas benefit both from intense vertical investigations and cross fertilization of ideas and methods from neighbouring areas. The intensity of research has grown, facilities to carry out sophisticated tests and fabrication have mushroomed and the desire to make myriad MEMS sensors and actuators has intensified. Still, even at the current rate of development, we see plenty of room at the bottom.

In India, MEMS research has paralleled the developments elsewhere over the last two decades, lagging behind marginally due to infrastructural constraints. Some national initiatives, notably, the National Program on Smart Systems (NPSM) and its second phase, the National Program on Micro and Smart Systems (NPMAS), have provided tremendous impetus to MEMS research. Starting from hardly two small MEMS research groups in the country in the early nineties to tens of research groups in universities and national laboratories today, and establishment of MEMS foundries like Semiconductor Laboratories (SCL), Chandigarh, Central Electronics Engineering Research Institute (CEERI), Pilani, and Bharat Electronics Limited (BEL), Bangalore, MEMS research in India has started flourishing. The number of papers presented by Indian researchers in national and international conferences in this area has increased by two orders of magnitude. These are truly exciting developments.

In 2007, the International Union of Materials Research Societies (IUMRS) organised the 10th International Conference on Advanced Materials (ICAM 2007) in Bangalore. This conference included a theme symposium on MEMS that spanned three days with paper presentations covering various aspects of MEMS technology. Out of all the papers presented in the symposium, we selected fifteen papers based on their reviews and other feedback and asked the authors to write the papers for possible publication in a journal. The papers were subsequently reviewed again and the authors were asked to respond to the critic of reviewers. The papers presented in this Special Issue are a result of this rather long drawn process. We have strived to bring a cross section of MEMS research to you, spanning work on novel MEMS materials, process technologies, devices, applications, design and simulation, fabrication and testing, and even system integration.

It is a pleasure to bring out this Special Issue of *Sādhanā* on Microelectromechanical Systems (MEMS). We have worked for over a year to put this issue together and we hope that it is informative and useful.

We thank the Editors of *Sādhanā* for enthusiastically endorsing the idea of bringing out a Special Issue on MEMS. We also thank the editorial staff of the journal for helping us with the entire process of bringing out this Special Issue.

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(Guest Editors)