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Foreword

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This special issue of Microgravity Space and Technology, MST, has emerged from two back to back workshops: The "Technology for Artificial Gravity and Microgravity Simulation" workshop at ESA-ESTEC, Noordwijk, the Netherlands combined with the first public demonstration of the Large Diameter Centrifuge (LDC), and the workshop on "Artificial Gravity" including demonstration of the DESDEMONA facility at TNO Human Factors Research Institute in Soesterberg, the Netherlands, in December 2007.

Both workshops covered the technology, use and application of centrifuges and microgravity simulation systems for gravity related research. DESDEMONA as a human rated system, while the LDC as designed for both physical and life sciences experiments. For microgravity simulations systems and operating scenarios like for clinostats, Random Positioning Machines (RPM) and magnetic levitators were presented. Also the rich heritage of on-board centrifuges that have been developed by ESA for past and current space flight facilities were discussed.

The application of ground based facilities for hypergravity or simulated near weightlessness studies are very complementary to the still scarce, and cumbersome microgravity studies in space. While for some studies only real microgravity is the only option, other studies benefit quite a lot by using a range gravity levels. Centrifuges are widely used in human and animal studies, in cell and plant biology but also in material science, fluid and plasma physics and geological studies. In this sense hypergravity is complementary to a pure space flight program. It is also clear that microgravity simulators, although bearing several artifacts, are very useful in preparing for real space flight experiments or as stand alone research facilities.

As guest editors of this volume I would like to thank all the participants, who stimulated the workshops by presenting and discussing the results of their research and thereby contributing to the advancement of gravity related research. In particular, the exchange among experts from different disciplines has given new insights into problems of mutual interest.

This volume of MST, is a collection of 10 papers of the most significant contributions that have been presented at the workshops. The collected work provides a good overview on the wide range of subjects discussed and the quality of the research presented.

Finally, I wish to mention all those who contributed to the preparation of this volume: the authors and especially the reviewers for the precious help in improving the quality of the papers. Last but not least, Microgravity Space and Technology which makes it possible to disseminate the current trends in hypergravity and simulated microgravity research by giving us the opportunity of this special issue.

I hope you will enjoy reading this volume and you will find in it cues and inspiration for your future research.

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