

Preface

Design is ubiquitous; it pervades all spheres of life, and has been around ever since life has been engaged in purposefully changing the world around it. While some designs have transcended time, most designs are in a perpetual process of being evolved. Research into design and the emergence of a research community in this area have been relatively new, its development influenced by the multiple facets of design (human, artefact, process, organisation, ecology, micro- and macro-economy by which design is shaped and which it shapes in turn) and the associated diversification of the community into those focusing on various aspects of these facets, in various applications. Design is complex, balancing the needs of multiple stakeholders, and requiring a multitude of areas of knowledge to be utilised, with resources spread across space and time.

The collection of papers in two book volumes constitutes the Proceedings of the Sixth International Conference on Research into Design (ICoRD'17) held at the Indian Institute of Technology Guwahati, Guwahati, India during 9–11 January 2017. ICoRD'17 is the sixth in a series of biennial conferences held in India to bring together the international community from diverse areas of design practice, teaching and research. The goals are to share cutting-edge research about design among its stakeholders; aid the ongoing process of developing a collective vision through emerging research challenges and questions; and provide a platform for interaction, collaboration and development of the community in order for it to address the global and local challenges by forming and realising the collective vision. The conference is intended for all stakeholders of design, and in particular for its practitioners, researchers, teachers and students.

348 abstracts was submitted to ICoRD'17 and selected for full paper submission. 223 full papers were submitted, which were reviewed by experts from the ICoRD'17 International Programme Committee comprising 241 members from over 151 institutions or organisations from 32 countries spanning five continents. Finally, 177 full papers, authored by 356 researchers (356 unique authors, actually 502 author entries in 177 papers) from 117 institutions and organisations from 19 countries spanning six continents, were selected for presentation at the conference and for publication as chapters in this book. ICoRD has steadily grown over

the last five editions, from a humble beginning in 2006 with 30 papers and 60 participants, through 75 papers and 100 participants in ICoRD'09, 100 papers and 150 participants in ICoRD'11, 114 papers and 170 participants in ICoRD'13, to 118 papers and 200 participants in ICoRD'15.

ICoRD'17 had 129 podium papers, and 48 papers with brief podium presentations followed by poster display and discussion. It had keynotes from prominent researchers and practitioners from around the world such as: Tetsuo Tomiyama from Cranfield University, UK, Jinan KB from Reimagining School, India, Cees de Bont from Hong Kong Polytechnic University, Hong Kong, Nitin Gupta from sickle Innovations, India, Monica Bordegoni from Politecnico di Milano, Italy, Pradeep G. Yammiyavar, IIT Guwahati, India, and Arun Garg, University of Wisconsin-Milwaukee, USA. It had one panel discussion on “Practice of Design”, and four workshops, on Decision-Making in Design, Emotional Engineering, Publishing Papers, and Asia Design. From 2015, ICoRD started giving ICON³ awards (acronym for **I**CoRD **O**utstanding **C**ontribution to design **N** scie**N**ce and education**N**) to outstanding contributors to design education and research. Prof. Sudhakar Nadkarni from Welinkar Institute of Management, India, and Prof. John Gero from George Mason University, USA were selected as ICON³ awardees for 2015, for their outstanding contributions to design education and design research respectively. Prof. Tetsuo Tomiyama of Cranfield University, UK and Professor Cees de Bont from Hong Kong Polytechnic University, Hong Kong, have been selected as the ICON³ awardees for 2017.

The chapters in the two book volumes together cover all three major areas of products and processes: functionality, form and human factors. The spectrum of topics range from those focusing on early stages such as creativity and synthesis, through those that are primarily considered in later stages of the product life cycle, such as safety, reliability or manufacturability, to those that are relevant across the whole product life cycle, such as collaboration, communication, design management, knowledge management, cost, environment and product life cycle management. Issues of delivery of research into design, in terms of its two major arms: design education and practice, are both highlighted in the chapters of the book volumes. Foundational topics such as the nature of design theory and research methodology are also major areas of focus. It is particularly encouraging to see in the chapters the variety of areas of application of research into design— aerospace, healthcare, automotive and so on.

The theme of ICoRD'17 has been “Design for Communities”. While Design traditionally focused on the development of products for the individual, the emerging consensus on working towards a more sustainable world demands greater attention to designing for and with communities, so as to promote their sustenance and harmony—within each community and across communities. ICoRD'17 has been hosted at the foothills of the Himalayas in the north-east of India, which is home to myriad linguistic and cultural communities with their own traditions, heritage and aspirations. It was only appropriate that the theme for ICoRD'17 aligned with this ambience.

This volume, 'ICoRD'17—Design for Communities, Volume 1' focuses on the topics of Design Theory, Research Methodology, Human Factors Design for X, Enabling Technologies, Design Management and Applications in Practice.

On behalf of the Steering Committee, Advisory Committee, Organising Committee and Co-Chairs, we thank all the authors, delegates, institutions and organisations that participated in the conference. We also thank members of the International Programme Committee for their support in reviewing the papers for ICoRD'17, which is essential for maintaining the quality of the conference, and for their support in putting this book together.

We are thankful to the Design Society and Design Research Society for their kind endorsement of ICoRD'17. We thank Indian Institute of Technology (IIT), Guwahati and its Department of Design, and Indian Institute of Science (IISc), Bangalore and its Centre for Product Design and Manufacturing, for their support of this event. We also wish to place on record and acknowledge the enormous support provided by Ms. Kumari M.C., Mr. Ranjan B.S.C., and Ms. Nishath Salma of IISc in managing the review process, and in preparation of the conference programme and this book, and the large and dedicated group of student-volunteers of IIT Guwahati and IISc Bangalore in the organisation of the conference. A special thanks goes to Dr. Prasad Bokil of IIT Guwahati for his relentless, day-to-day organisational support and leadership to make ICoRD'17 a success. Finally, we thank Springer, especially Senior Editor Swati Meherishi and Editorial Assistant Aparajita Singh, for the wonderful support extended in the publication of this book and in sponsoring books and book coupons for ICoRD'17 Distinguished Paper Awards and ICON³ Awards.

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