THE 20TH INTERNATIONAL CONFERENCE
ON ENGINEERING DESIGN (ICED15)

DESIGN FOR LIFE

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Preface by the Programme Chair

We welcome you to the proceeding of the 20th International Conference on Engineering Design 2015 (ICED 15) held at the Bovisa campus of Politecnico di Milano, Milan, Italy. The theme of the Conference is “DESIGN FOR LIFE”, inspired by EXPO 2015 in Milan.

These proceedings of ICED 15 contain 427 double-blind peer-reviewed and accepted papers. The proceedings are published in different forms: a book of abstracts and a soft-copy of all contributions on a USB-based memory device for conference delegates plus printed books (11 volumes), which are available to the public via a print-on-demand service. All these different forms of proceedings are numbered against both Design Society and ISSN/ISBN referencing to allow wider access, better referencing and improved citation in the near and distant future. Additionally, all papers contain a citation proposal for a reproducible citation. The 11 volumes of the books are structured according to the conference topics and the sequence of the sessions. All papers in the proceedings have successfully fulfilled the criteria for acceptance in ICED 15.

Continuing on from the changes introduced for ICED 13, the papers in the proceedings were produced by combining an automatically generated cover page, based on the contribution details in the Conference Management System (ConfTool), with the paper as submitted by the authors, starting with the introduction section. This procedure supports consistent data for the papers, the conference programme, the Book of Abstracts, etc.
ICED 15 and its proceedings are the result of the dedicated efforts of many people:

- the authors who submitted excellent papers (both in content and form),
- the reviewers who provided timely comments and positive feedback that helped to optimise the quality of papers,
- the chairs, assistant chairs and members of the Programme and Organising Committee and the Design Society Administration who had to deal with details galore in getting the conference and the proceedings planned, structured, organised and ready to go (it was also fun, though!).

Thank you all very much!

On behalf of the Programme Committee we hope that you enjoy the programme and participate fully in what is arguably the Premier engineering design research conference in the world. We also hope that you find time to discover Milan and EXPO 2015, that you meet old friends and make some new ones, and that – besides work – you also have as much fun as we had when preparing the conference!

Christian Weber
Programme Chair

Stephan Husung
Assistant Programme Chair

Preface by ICED15 Conference Chair

Having reached its 20th edition, ICED15 confirms to be a well-established conference in the scientific design community and we are very pleased and honoured to host this edition, which has received a very significant attention from researchers and practitioners throughout the world.

ICED15 is being organized at the same time and in the same location as the Universal EXPO. The EXPO has also inspired the theme of our conference - Design for Life - which has been further formulated as Design for a Healthy, a Sustainable and a Contented Life. While the submissions were arriving and the conference program was taking shape, we were very pleased to observe that this conference theme has indeed been picked up by many authors and has permeated their contributions. As an outcome of this emerging synergy between ICED and EXPO, we expect participants to return to their countries not only with the usual benefits that come from the ICED experience, but also with a stronger capability and determination to make positive and effective contributions to humankind through design research, education and practice.

If one looks at the program of previous ICED conferences, it is quite apparent that the field of design is continuously evolving, and that the Design Society community that is at the heart of ICED is also at the forefront of this continual evolution and adaptation to emerging opportunities and challenges. Specifically, ICED15 welcomes a growing number of contributions in fields pertaining to the human and social aspects of design, looking at humans both as actors and as recipients of the design activity. We all know that these advancements do not only take place in the formal presentation sessions, but also through other gatherings, including business meetings, information events, workshops and – of course –social events. The conference program has therefore been designed with the objective of providing ICED participants with a variety of opportunities for meeting and exchanging views.

All this will occur within the setting of a country such as Italy that – since ancient times, going through the Renaissance and until today – has been uniquely able to blend its technical know-how with an amazing quality of life. We therefore hope that you will make a memorable experience of ICED 15, the EXPO and of the ideal of Designing for Life.

Gaetano Cascini
Conference Chair

Marco Cantamessa
Conference Chair

Preface by the Design Society President

ICED 15, the 20th edition of the International Conference on Engineering Design (ICED) is coming back to Italy, the country where the idea of a design conference first took shape. The first ICED took place in Rome in March 1981. The aims were, as its initiator Vladimir Hubka wrote in December 1980, set towards: *"… determining the latest state of knowledge in areas of scientific design methods, and of gathering information about current results and future trends in research, to achieve a free co-ordination of scarce research resources."*

This year, we are not in Rome, but in Milan - and for a good reason. The city of Milan itself is a synonym for quality of design as a way of thinking and living, in activity or in outcome. The conference themes indicate the broadness of thinking about design in and around the host city and connect the conference with the Universal EXPO that is also taking place at the same time. ICED 15 participants will have chance to experience the dynamics of a city that reflects all of the dichotomies that define design old and new, the art and technology, the research and practice, the chaotic and systematic. In the past thirty-five years the conference has become the event where all the richness of design research from all the continents is presented and all aspects of design explored ICED 15 sessions are the results of continuous improvements in every aspect of conference organisation. The format of the conference is based on the previous events with a programme made up of plenary sessions, podium presentations, discussion sessions with a focused debate and workshops led by the Design Society's Special Interest Groups. In addition, the Young Members' Event and PhD Forum extend the networking opportunities of ICED 15 for younger or first-time participants. The ICED 15 programme will provide an exciting opportunity for researchers and practitioners to learn about the latest developments in design research and practice.

The programme of ICED 15 is the result of a joint effort from great teams that have been working together since the last ICED conference in Seoul. The Society extends its gratitude to all the authors who have submitted their papers and all the reviewers who have helped to select papers ensuring an outstanding conference experience for all participants. A special thank you goes to all the authors and Session Chairs who will make this experience possible.

Many things have changed through the last 19 conferences. The conference started in Rome by WDK (Workshop – Design – Konstruktion), has, since 2001, been organised by the Design Society. Design as a field has expanded tremendously and the conference programme has become more interactive and complex, opening new opportunities and challenges. Organising a conference with such a history takes an enormous amount of work and attention to detail. I would like to express sincere thanks of the Society to Gaetano Cascini and Marco Cantamessa and all colleagues from Politecnico di Milano and Politecnico di Torino who have made this conference happen. Special thanks also to Programme Chair Christian Weber and Assistant Programme Chair Stephan Husung and all the members of Programme Committee for ensuring that this conference presents a tremendous quality of content. Finally, thank you to all of the participants whose attendance and input are a constant sign that this conference and design as a field are going in the right direction.

Dorian Marjanovic
Design Society President

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