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Advancing Life Cycle Engineering to meet United Nation’s Sustainable Development Goals

Editorial

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This volume of Procedia CIRP holds the proceedings of the 25th CIRP Conference on Life Cycle Engineering held in Copenhagen, 30 April – 2 May 2018. The conference was organized by the Quantitative Sustainability Assessment Division at the Management Engineering department at Technical University of Denmark. 25 years after the series of LCE conference was initiated by Professor Leo Alting and hosted by Technical University of Denmark in 1993, the conference thus returns to Copenhagen. Over these 25 years the Life Cycle Engineering conferences have been organized and hosted by institutions all over the world under the auspices of CIRP. They have matured and grown in attendance and scientific quality, and have made significant impact by strengthening, developing and disseminating Life Cycle Engineering (LCE) research and application through collaborations between universities and manufacturing industry. The 25th anniversary is celebrated at the conference, and we honour and credit the many stakeholders that over the 25 years have made valuable contributions to drive and develop the LCE activities from an initial focus on disassembly and life cycle assessment to a current coverage of all aspects involved in engineering the life cycle.

At the conference we also look ahead, in particular towards the Sustainable Development Goals (SDGs) that were adopted by all member states in 2015, and through which the United Nations have set targets for a sustainable world in 2030. These goals will define a development agenda for countries and companies around the world in the decades to come. This is why the theme of the 2018 CIRP LCE conference addresses how we can and must advance life cycle engineering methods and tools to help engineering play a central role in the achievement of the goals. The majority of the 17 SDGs have technology as a strong driver, and LCE activities address many of them, notably those that target human health (SDGs 2 and 3 on hunger and health), infrastructure (SDGs 6, 7, 9 and 11 on water, energy, infrastructure and cities), innovation, production and consumption (SDGs 9 and 12) and our impacts on the planet (SDGs 13, 14 and 15 on climate and life on land and in water). The conference papers address technological contributions to meet many of these challenges.

For the conference we accepted a total of 314 abstracts resulting in submission of 206 full paper manuscripts. A thorough peer review process resulted in the acceptance of 170 papers that you find in this volume of Procedia CIRP. Altogether, these papers represent contributions from 27 countries on all continents. The papers cover a wide selection of topics spanning the fields of LCE with a notable emphasis on manufacturing process efficiency, LCE for circular economy (focused on resource efficiency through eco-design, maintenance and durability, remanufacturing, and recycling), and technology-specific LCE focused on additive manufacturing, energy systems, building and cities, food and biomaterials.
We gratefully acknowledge the contributions from the members of the scientific committee who helped ensure a professional review of all submitted papers in spite of the short deadlines. We thank the members of the editorial committee, who managed the handling of the many papers within a tight and pressing schedule. We thank the many authors who present their work in the papers of this volume as well as at the conference, and we in particular express our gratitude to the members of the organizing committee, who have worked long and hard to allow this event to take place. Finally, we wish to express our gratitude to CIRP and to previous hosts of the CIRP LCE conferences who have generously shared their experience and offered valuable advice and support to our organization of the conference.

Development of a sustainable human civilization on the planet means to meet the needs of present generations in a way that does not compromise the ability of the future generations to meet their needs. This is a daunting task considering the current consumption and resource use and the increase in both that is foreseeable in the coming decades due to a growing global population and a rising standard of living in many parts of the world. We therefore need to change life cycle engineering from its current focus on technological eco-efficiency (‘doing more with less’) to eco-effectiveness of the technology, thus making technologies support a world that is sustainable in absolute terms – not just ‘better’ but ‘good enough’. This will be a fundamental challenge in the next 25 years of the CIRP LCE conferences, and it is our hope that the conference papers in this volume will help inspire this direction for life cycle engineering activities in the years to come.

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Conference Chair

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Managing Editor

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Organizing Committee Chair