

Jens Bennedsen, Aage Birckjær Lauritsen,
Kristina Edström, Natha Kuptasthien, Janne
Roslöf & Robert Songer (eds.)



The 15th International CDIO Conference

Proceedings – Full Papers



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AARHUS UNIVERSITY



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Editorial

The CDIO approach is an innovative educational framework for producing the next generation of engineers. The aim is an education that supports students in the acquisition of strong technical fundamentals while simultaneously developing the necessary professional skills required of a practising engineer. This is done by providing students with dual-impact learning experiences that are based upon the lifecycle of an engineering project, the Conceiving – Designing – Implementing – Operating (CDIO) of real-world products, processes, and systems. Throughout the world, more than 165 institutions have adopted CDIO as the framework of their curriculum development.

The Annual International Conference is the central meeting of the CDIO Initiative, and it includes presentations of papers as well as specialised seminars, workshops, roundtables, events and activities. The 15th International CDIO Conference takes place in Aarhus, Denmark, June 24-28, 2019, hosted by Aarhus University. The organisers together with the city of Aarhus welcome you to the event!

The theme of this year is Change. The theme is visible in the keynote presentations, paper presentations, roundtables and workshops. The rich topical program will facilitate lively discussion and contribute to the further advancement of engineering education.

The conference includes three types of contributions: Full Papers, Project in Progress contributions, and Extended Abstracts. The Full Papers fall into three tracks: Advances in CDIO, CDIO Implementation, and Engineering Education Research. All contributions have undergone a full single-blind peer-review process to meet scholarly standards. The Projects in Progress contributions describe current activities and initial developments that have not yet reached completion at the time of writing, and the Extended Abstracts summarise the Roundtable discussions and Workshops held at the event.

Initially, 226 abstracts were submitted to the conference. The authors of the accepted Full Paper and Projects in Progress abstracts submitted 142 manuscripts to the peer-review process. During the review, 458 review reports were filed by 104 members of the 2019 International Program Committee. Acceptance decisions were made based on these reviews. The reviewers' constructive remarks served as valuable support to the authors of the accepted papers when they prepared the final versions of their contributions. We want to address our warmest thanks to those who participated in the rigorous review process.

This publication contains the 75 accepted Full Paper contributions to be presented at the conference, of which 3 are Advances in CDIO, 60 are CDIO Implementation, and 12 are Engineering Education Research. These papers have been written by 234 different authors representing 25 countries. This book is available as an electronic publication only. In addition to the Full Papers, 28 Projects in Progress contributions, as well as 14 Extended Abstracts,

are to be presented at the conference and are not included in this publication. Two working groups have been working prior to the conference and the day before the conference.

We hope you find these contributions valuable for your own research, curriculum development, and teaching practice, ultimately furthering the engineering profession. We also hope that you benefit through the truly unique community of practice that exists within the CDIO Initiative. More than 140 institutions from 33 countries, representing 6 continents, will be present at the conference. Seize the opportunity to discuss and share with colleagues, as global awareness and partnerships are of significant importance in the education of the next generation of engineers.

Wishing all of you a wonderful CDIO 2019 experience!

Aarhus, 24 June 2019

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