

**Jerker Björkqvist, Kristina Edström,
Ronald J. Hugo, Juha Kontio,
Janne Roslöf, Rick Sellens &
Seppo Virtanen (eds.)**



The 12th International CDIO Conference

Proceedings – Full Papers



45

Research
Reports

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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 to acquire a deeper working understanding of the technical fundamentals while simultaneously developing the competencies needed for Conceiving – Designing – Implementing – Operating (CDIO) real-world systems, products, and processes. Throughout the world, more than 125 institutions have adopted CDIO as the framework of their curriculum development.

The Annual International Conference is the main meeting of the CDIO Initiative and it includes presentations of papers as well as special seminars, workshops, events and activities. The 12th International CDIO Conference takes place in Turku, Finland, June 12–16, 2016, hosted by Turku University of Applied Sciences. The organizers together with the City of Turku welcome you to the event!

The main theme of this year is *Enhancing Innovation Competencies through Advances in Engineering Education*. It is visible in the keynote presentations, topical sessions and workshops. The rich topical program will facilitate lively discussion and contribute to further development of engineering education.

The conference includes two types of contributions, Full Papers and Projects in Progress. The Full Papers fall into three tracks: Advances in CDIO, CDIO Implementation, and Engineering Education Research. All Full Papers have undergone a full single-blind review process to meet scholarly standards. The CDIO Projects in Progress contributions describe current activities and initial developments, and were selected by the program committee co-chairs based on the submitted abstracts.

Originally, 239 abstracts were submitted to the conference. The authors of the accepted Full Paper abstracts submitted 141 Full Paper manuscripts to the peer review process. During the review, 295 review reports were filed by 74 members of the 2016 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 full 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 100 accepted full papers that will be presented at the conference, of which 14 are Advances in CDIO; 72 CDIO Implementation; and 14 Engineering Education Research. These papers have been written by 283 different authors representing 24 countries. This book is available as an electronic publication only. In addition to the Full Papers, 57 CDIO Project in Progress contributions will be presented at the conference and are not included in this publication.

We hope that you find these contributions valuable in developing your own research, curriculum development, and teaching practice, ultimately furthering the engineering profession. Seize the opportunity to discuss and network with colleagues during the conference. Global understanding and partnerships are of major importance in educating the future generations of engineers.

Wishing all of you a fruitful CDIO 2016 experience!

Turku, May 13, 2016

Jerker Björkqvist

Kristina Edström

Ronald J. Hugo

Juha Kontio

Janne Roslöf

Rick Sellens

Seppo Virtanen

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Finland

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