Nomination for the SEFI Leonardo da Vinci Medal 2018

Professor of Product Development and Dean of Education

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The Leonardo da Vinci Medal is the highest distinction SEFI can bestow. The Medal is awarded once a year to a living person who has made an outstanding contribution of international significance to engineering education.

Motivation

Professor Johan Malmqvist has made an outstanding contribution with international significance to engineering education. He is a professor in product development at Chalmers University of Technology in Gothenburg, Sweden. He obtained his PhD from Chalmers in 1993 and was appointed professor in 2005. His engineering research focuses on development methodologies and IT support for product development. The results include new design methods and IT tools, but also empirical studies of product development practices. The research is conducted in close collaboration with Swedish industry. Current projects investigate methods and tools for development of product-service systems and knowledge-based engineering tools.

Professor Johan Malmqvist is intensely engaged in the renewal of engineering education. As a dean of education, he is responsible for Chalmers education programs in mechanical, automation and industrial design engineering as well as the naval programs. Malmqvist was one of the co-founders of the Conceive-Design-Implement-Operate (CDIO) Initiative, an international effort that aims at developing a framework for improving engineering education.

CDIO – the Conceive-Design-Implement-Design Initiative

An outstanding contribution to engineering education of international significance

The CDIO Initiative for engineering education reform started as a project in 2000 by three Swedish universities, Chalmers University of Technology, KTH Royal Institute of Technology and Linköping University, and MIT Massachusetts Institute of Technology in the United States. The starting point was the recognition that engineering education had become increasingly distanced from engineering practice. The vision of the CDIO Initiative was to educate students to master a *deeper working understanding* of the technical fundamentals and to be able to lead in the process of engineering, i.e. to lead in *conceiving, designing, implementing and operating* new products, processes, and systems; hence the acronym.

From the start in 2000, Johan Malmqvist served as the one of two equal Co-directors, which established the top management of the CDIO Initiative. He stayed in this position until 2017, when he stepped down. During this period, the initiative grew from a project with the four founding partners to a global organisation with over 140 collaborating institutions (see for instance Malmqvist, Hugo & Kjellberg, 2015). The annual International CDIO Conference, now in its 14th year, usually attracts about 300 participants with some 100 full papers in the proceedings.

Johan Malmqvist´s leadership of the CDIO initiative has been universally supportive and responsive, democratic, generous, and unfailing for 17 years. He has led a large number of working meetings every year - some with more than hundred participants, coordinated the communication with members and interested parties, and set up an office at Chalmers for supporting members and disseminating CDIO.

Johan Malmqvist has also been instrumental in the development of the CDIO philosophy and concept, always leading a cycle in which the development is well argued, well documented, widely shared, critiqued, and further refined, before it is finally established (see for instance Crawley et al, 2011). He is a key force behind. many key publications and documents, most notably co-author of the book *Rethinking Engineering Education - The CDIO Approach*, first ed. 2007 and 2nd ed. 2014, also translated into Chinese, Spanish, Russian, and Vietnamese. Johan Malmqvist has especially paid attention to the implementation of the CDIO approach into national frameworks for engineering education and focused on advantages and compatibilities with respect to various accreditations requirements (Malmqvist et al, 2006; Malmqvist 2009).

Chalmers and Sweden

An outstanding contribution to engineering education of national significance

Johan Malmqvist has served as evaluator of numerous programmes, centres and project proposals, and he has been the opponent or committee member for many PhD defences. As the project leader for a Swedish Engineering Education Network, Johan Malmqvist was one of the founders of the Swedish national conference on Engineering Education Development, which was held the first time in 2008 and has continued to grow in size and importance to become a centre of force for Swedish engineering education. Last year, at Chalmers, it attracted 300 participants.

Johan Malmqvist has ensured that Chalmers was always a first-rate showcase of CDIO implementation, first as chair of the Mechanical Engineering programme, then as Dean of Education. The Mechanical Engineering programme was the pilot programme for CDIO implementation, documented in numerous conference papers (see for instance Malmqvist et al, 2010; Enelund, Knutson Wedel, Lundqvist & Malmqvist, 2013). The programme has received numerous awards and distinctions. Malmqvist and his collaborators have demonstrated the powerful programme-driven approach to implement the integrated curriculum, making Chalmers a proof-of-concept for the CDIO model. Their work can serve as role model for others as they have systematically created the conditions for leading, planning and developing the programme, and for constantly setting new goals.

This year, Johan Malmqvist is stepping down as Dean of Education, and he is about to set new goals again, for himself, for Chalmers, and for engineering education. Only one thing is certain. It will be exciting to follow his work in the future.

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