A guide to smart manufacturing

At the end of May, Hans Krikhaar, owner of Hurli and president of DSPE, delivered his inaugural address as a professor (lecturer) of Smart Manufacturing & Integrated Systems Engineering at the Fontys University of Applied Sciences in Eindhoven (NL) and Venlo (NL). Within the department of Engineering in Eindhoven and the department of Technology and Logistics in Venlo, he will guide research into mechanical engineering, electronics, mechatronics and automotive with links to logistics, ICT, industrial design, medical technology and business.

The inaugural address was the closure of ASQ Fontys, the annual high-tech event for companies interested in collaborating with Fontys in application-oriented research on innovative technologies in the area of High Tech Systems and Materials (HTSM). Participants were able to visit three Fontys labs, devoted to 3D-printing, Mechatronics and Robotics, and Applied Natural Sciences, respectively, or attend one of the 15 HTSM knowledge sessions. At the Technology Expo, Fontys students and researchers presented their research results.

Cover of the inaugural address booklet, "A Guide to Smart Manufacturing". Hans Krikhaar: "If you want to start an industrial revolution, you need a booklet."

'Support acts' for Hans Krikhaar's performance were provided by Maarten Steinbuch and Egbert-Jan Sol. Steinbuch, university professor at the Eindhoven University of Technology (TU/e), stressed the importance of research at universities of applied sciences, as it meets the needs of SMEs far better than academic research and provides inspiration to students and teachers alike. He attributed Fontys an important role in the new Eindhoven Engine initiative. Located on the TU/e campus, the Eindhoven Engine aims to accelerate innovation in the Brainport (greater Eindhoven) region through challenge-based research, by students and teams of talented researchers from industry and knowledge institutes.

Until now, research has been conducted linearly, but technological developments are progressing exponentially, so research has to be organised in a different way, according to Steinbuch. Therefore, the Eindhoven Engine strives to organise multidisciplinary, multi-stakeholder research in 'student teams for adults' and build research consortia with SMEs. He reiterated on the title of Krikhaar's professorship and stated that all five words (smart, manufacturing, integrated systems, engineering) are important. He also acknowledged the role of DSPE, presided by Krikhaar since 1998, as it celebrates precision engineering, building on Wim van der Hoek's legacy (see the article on page 5 ff.), as a cornerstone of the Dutch high-tech industry.
Sol, CTO at TNO Industry and programme director Smart Industry, promoted lifelong learning in the age of smart industry and digital (r)evolution. "Everyone aged 35+ who has attended secondary vocational training did not acquire any digital skills at school. As there is an increasing shortage of ICT professionals, everyone should master ICT skills."

In his inaugural address, Hans Krikhaar presented his vision on how to embed research in education, how to help industry innovate and how to shape the ambitions of Fontys as a hub for smart manufacturing. In Krikhaar's view, smart manufacturing is about innovating production processes, by using the latest technologies and applying smart production methods, resources and methods. Innovation should preferably be organised in an agile manner: simple, step-by-step, maximum stakeholder involvement, minimum effort, minimum designs,

Impressions of the ASQ Fontys event. (Photos: Odette Beekmans)

minimum bureaucracy. It requires flexibility, brainstorming and outside-of-the-box thinking, as well as continuous improvement through lean/six sigma approaches. Smart manufacturing will rely on disruptive technologies like artificial intelligence, big data, augmented reality, drones, 3D printing and 5G communication, but also on education.

Krikhaar presented his view on continuous learning in the Fontys curriculum, in which research is embedded via projects, internships and graduation theses. "We want to align the curriculum in such a way that students can develop a train of competences and students from different years can team up in projects to create ongoing research lines." Krikhaar's ultimate ambition at Fontys is to enhance the innovation competences of students, teachers and the university itself, in collaboration with industry and institutes like TU/e, Brainport Industries Campus and the Eindhoven Engine.

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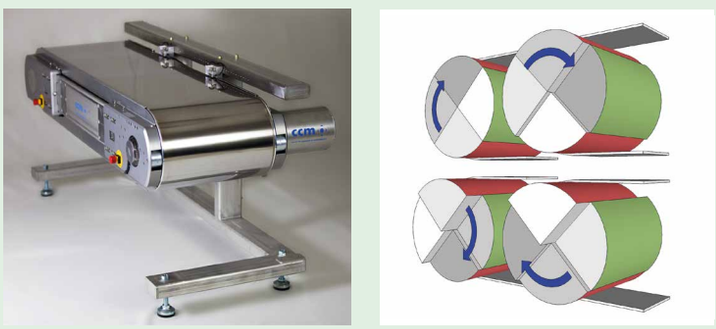
Hans Krikhaar delivering his inaugural address: "We want to align the curriculum in such a way that students can develop a train of competences, upon which they can draw in following semesters." The Fontys curriculum is divided in eight semesters, from S1 to S8. For example, the project experience from S4 and the minor specialisation from S6 can be combined in the graduation project in S8.

Sioux CCM celebrates 50th anniversary

Last month, Sioux CCM celebrated its 50th anniversary. In 1969, Professor Horowitz started CCM Centre for Concepts in Mechatronics from the basement of the Eindhoven University of Technology together with three friends. Later, CCM moved to Nuenen (NL) and in 2014 it was taken over by Sioux (over 700 engineers, headquarters in Eindhoven, NL), a group of companies supporting or acting as the R&D department of leading high-tech OEMs.

Now, Sioux CCM has grown into the Sioux mechatronics competence centre, employing over 125 engineers, serving many renowned, international customers, including ASML, Philips, Thermo Fisher Scientific and Kulicke & Soffa. Sioux CCM develops and creates innovative mechatronic solutions, from conceptual design to the production of test sets, single-use machines and serial products. CCM expertise includes precision movement and positioning, miniaturisation, vacuum technology, optical monitoring and embedded design.



In the 2013 no. 3 issue of Mikroniek, CCM presented the design & realisation of a generic substrate carrier (left) using axially movable segments (right).

Change of management at the Leiden Instrument Makers School

Last month, Dick Harms retired as director of the Leiden Instrument Makers School (LiS). The LiS is one of the oldest vocational educational institutions in the Netherlands and over the years has retained its independent status, of which Harms has been a strong advocate. The school was founded in 1901 by the Leiden professor and Nobel Prize-winner Heike Kamerlingh Onnes, because he needed professionals who could develop and make tools for physics research.

During Harms' directorship the LiS expanded and modernised its facilities so it could double in size to a maximum capacity of 400 students, in order to meet the growing demand from industry for good instrument makers, while retaining the quality inherent in small-scale education. As his successor, Godelieve Bun has taken over the director's position. She studied mechanical engineering at Delft University of Technology and worked in the food industry and in various educational positions, among others as a team leader in the precision engineering department of HU University of Applied Sciences Utrecht.

A forthcoming issue of Mikroniek will include more on past and future developments at the LiS.

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The retiring and incoming director of the LiS, Dick Harms and Godelieve Bun, respectively.