

FRAUNHOFER INSTITUTE FOR PRODUCTION TECHNOLOGY IPT
LABORATORY FOR MACHINE TOOLS AND PRODUCTION ENGINEERING
(WZL) OF RWTH AACHEN UNIVERSITY

PRESS RELEASE

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30th Aachen Machine Tool Colloquium: Securing Future Competitiveness by Sustainable and Resilient Production

Industrial production today is only about one thing: productivity. Until now, the values behind this term have prevented a zero-emission and sustainable production, even though it would already be technologically and economically possible. However, changing requirements of the capital market from a plain financial orientation to a holistic view of sustainability, demand that German companies rethink the concept of productivity. The Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University and the Fraunhofer Institute for Production Technology IPT will discuss the question of how the Internet of Production (IoP) can support this process and at the same time make companies crisis-proof during the 30th Aachen Machine Tool Colloquium (AWK) on September 22 and 23, 2021, at Eurogress Aachen and in digital form.

With the effects of the Corona pandemic hitting many manufacturing companies and changing the global economy in the long term, once again trend-setting questions are arising around the future of production technology. At this new date this fall, the 30th AWK will therefore also be about strengthening the industrial resilience of companies: we aim to enable companies to deal successfully with drastic crises and to be able to operate profitably again within a short period of time. At the same time, the organizers want to sharpen the entrepreneurial view of the future so that the production turnaround towards a sustainable productivity can be achieved. For the visitors of the event, the colloquium should provide important impulses to remain competitive in an international comparison in the long term.

AWK'21's new guiding theme, "Turning Data into Sustainability", is designed to show how manufacturing companies can use on-demand data collection and machine learning to achieve rapid, error-free improvements in serial production, and how they can thereby produce in a resilient and sustainable manner.

Editors

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Limit Overproduction and Reduce Resource Consumption

Over the past 100 years, industrialization has taken hold of almost all sectors of the economy and has been characterized by continuous cost optimization, time savings and quality improvements. However, the resulting overproduction, besides being economically reasonable, has led to a rapid increase in resource consumption and CO² emissions. Although this is the reason why large parts of the population can now afford to own purchased goods such as clothing, appliances, vehicles, machines or infrastructure, the production of these goods consumes energy and raw materials, the recuperation of which is often impossible.

Today, this capital- and resource-intensive productivity thinking is being overtaken by the future image of a more ecologically minded society. As a result, the capital market is also changing its target: away from the capital-intensive business models of industry. The focus of investors is changing – toward environmental, social and corporate governance issues that are forcing manufacturing companies to make sustainable changes.

Using Digitization to Quantify the True Costs of Production

The organizers of the Aachen Machine Tool Colloquium therefore see one answer to the resulting challenges in a transition towards a sustainable and emission-free production design. The researchers from Aachen identify the so-called Internet of Production (IoP) as the most important enabler of such a production turnaround: the end-to-end digitization and networking of machines and plants within the production and value chain.

The IoP is designed to help manufacturing companies achieve greater sustainability, efficiency, productivity, quality and competitiveness. The secure availability of data, information and knowledge, at any time and any place, is considered one of the most important promises of Industry 4.0 and at the same time forms the basis for further development. For science and industry, the task at hand is to address the central questions that will be at the heart of AWK'21: How valuable is the variety of recorded data in companies today for manufacturing companies? How can algorithms and analyses be used to make reliable forecasts in order to gain end-to-end control over production and be able to operate efficiently and profitably as well as sustainably?

“In many areas of production, we are reaching the limits of our knowledge with conventional methods, technologies and processes. However, digitization is now enabling us to exceed these limits”, explains Professor Thomas Bergs, whose chair is responsible for the organization of this year's event, and he adds: “The more we know about our complex processes and their boundary conditions, the better we can identify the true cost of our products and save valuable resources.”

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The Internet of Production thus forms a starting point for mastering the requirements placed on manufacturing companies by the production turnaround: based on a Digital Shadow, the IoP provides the infrastructure and creates the conditions for being able to use raw data along the product lifecycle. The resulting transparency along all product life cycles and stages of the value chain can help ensure that production is ultimately geared to customers' actual requirements and demand quantities. Digitization enables companies, for example, to save materials and energy, reduce wear and tear on tools and machines, and make costly high-tech products lighter, more robust and more efficient.

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Above all, data on requirements, development, (serial) production and the use of goods must already be incorporated into product design and production planning so that production itself can be continuously optimized. While companies have so far often questioned the added value of digital networking, this context reveals their contribution to more sustainable action. In the upcoming years, the assessment of the performance of companies will shift significantly in all manufacturing sectors, according to the forecast of the Aachen scientists. As a result they believe companies are now being called upon to evaluate and optimize their range of services and their value creation on the basis of the three sustainability-related areas of corporate responsibility: Environment, Corporate Social Responsibility and Corporate Governance. One of the goals of Bergs and his colleagues Christian Brecher, Robert Schmitt and Günther Schuh is to be able to answer the question of the related value of a product as precisely as possible at the AWK'21.

AWK'21: Hybrid Information Hub for Production Technology Trends

The Aachen Machine Tool Colloquium is both a network meeting and an information hub. Participants from different disciplines traditionally exchange ideas on the production of tomorrow every three years in Aachen. Accompanied by an international top-class lecture program and with thematic tours through the hosting research facilities, the conference will again offer a comprehensive insight into the trends of applied research and development for specialists and executives from industry and science after its postponement to September 2021.

In addition to the usual face-to-face event, there will be a premiere at the 30th Aachen Machine Tool Colloquium: besides the analog event at the Aachen Eurogress, there will also be digital transmission of large parts of the event program for the first time. An online platform will ensure that not only the participants on site in Aachen, but also a worldwide audience of experts can attend the event, irrespective of possible continuing travel restrictions due to the pandemic.

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Four Lecture Sessions with Interdisciplinary Perspectives

Two parallel lecture sessions will provide participants with first-hand information on the results of applied research and practical implementation in production. Interdisciplinary speakers from science, development and management of leading companies from different industries have been invited to jointly develop the lecture topics in expert working groups.

The four sessions will each include several presentations on the topics of “Architecture of a Networked Adaptive Production”, “Digital Twins in the Production Cycle”, “Data Sciences in Production” and “Sustainable Productivity”. With reference to the adapted event motto, the focus will now also be on the question of how the value of the respective technological and economic innovations can be measured, exploited and implemented in the sense of more sustainable production in the future.

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The **Fraunhofer Institute for Production Technology IPT** combines many years of knowledge and experience in all areas of production technology. The Fraunhofer IPT offers its customers and project partners applied research and development for networked, adaptive production in the areas of process technology, production machines, production quality and measurement technology as well as technology management. The institute's range of services is geared to the individual tasks and challenges within specific industries, technologies and product areas, including automotive engineering and suppliers, energy, life sciences, aviation, mechanical and plant engineering, optics, precision and micro technology as well as tool and die making.

The **Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University** supports the innovative strength and competitiveness of industry with trend-setting basic research, applied research and the resulting consulting and implementation projects in the field of production technology. In the research fields of manufacturing technology, machine tools, production systematics, gear technology, manufacturing metrology and quality management, practical solutions for rationalizing production are developed with industrial partners from a wide range of sectors.