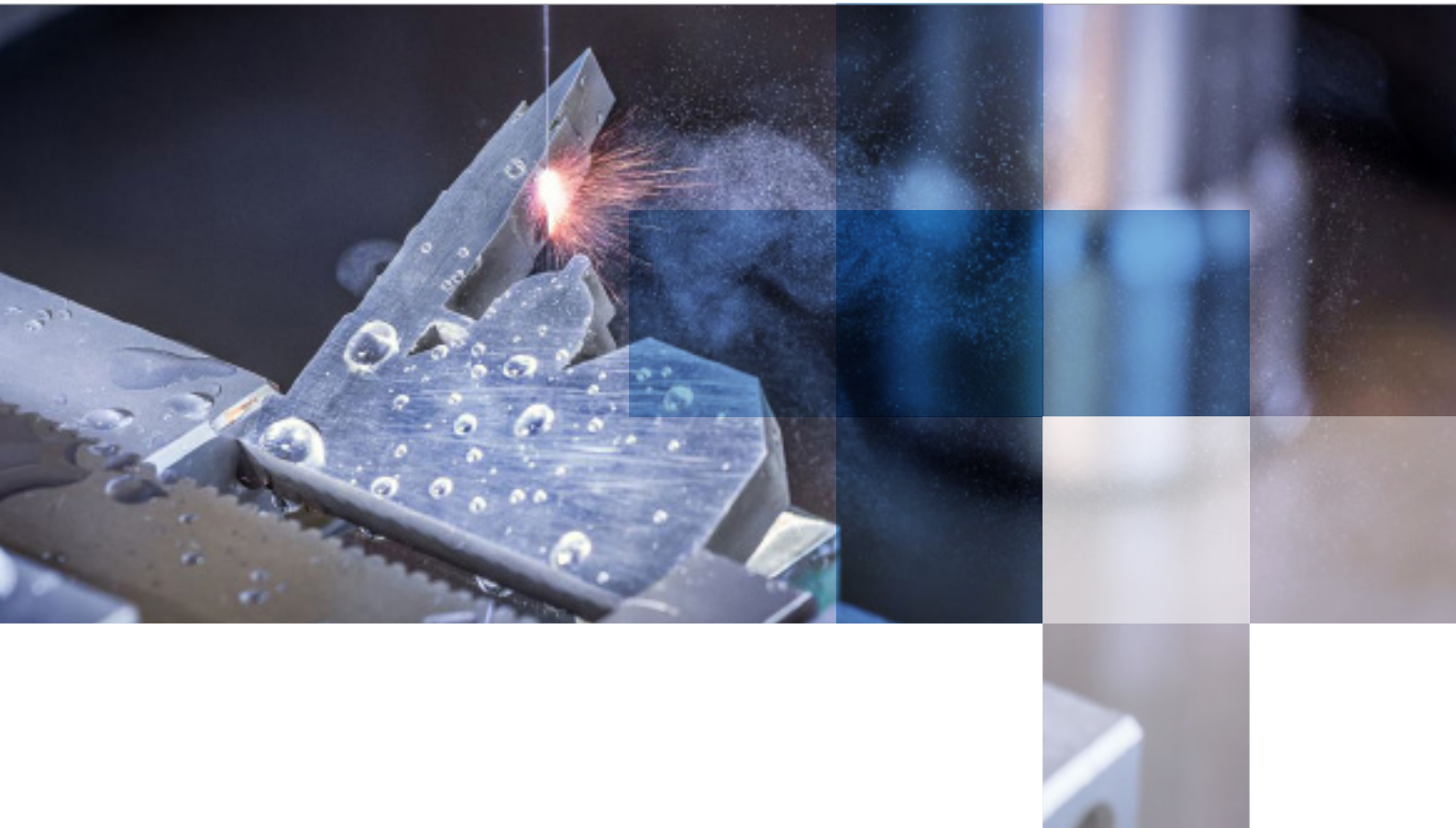




**WBA  
WERKZEUGBAU  
AKADEMIE**



**Tooling in Series**

# Initiators



## **Prof. Wolfgang Boos**

Prof. Wolfgang Boos is the CEO of the WBA Aachener Werkzeugbau Akademie GmbH (WBA Tooling Academy). In addition, he is the executive chief engineer of the Chair for Production Engineering at the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University. In this function, he is the deputy head of the Cluster for Production Technology on the RWTH Aachen campus, which includes the WBA. Considering that Prof. Wolfgang Boos is a trained toolmaker and received his doctorate in mechanical engineering, he is familiar with all facets of the tool and die industry.



## **Prof. Günther Schuh**

Prof. Günther Schuh has held the Chair for Production Engineering at the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University since 2002 while also serving as the director of the FIR (Institute for Industrial Management) at the RWTH Aachen University. Additionally, he is a member of the directorate of the Fraunhofer Institute for Production Technology IPT and is the head of the area of Technology Management. Prof. Günther Schuh is one of the initiators of the RWTH Aachen campus and also its first and largest center, the WBA Tooling Academy. As well, he is the head of the Cluster for Production Technology on the RWTH Aachen campus.

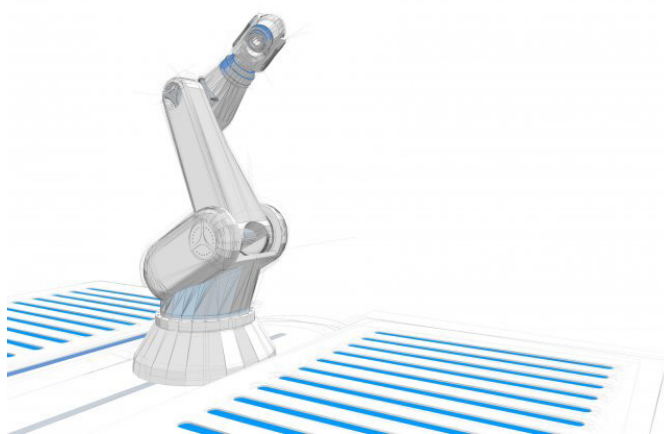
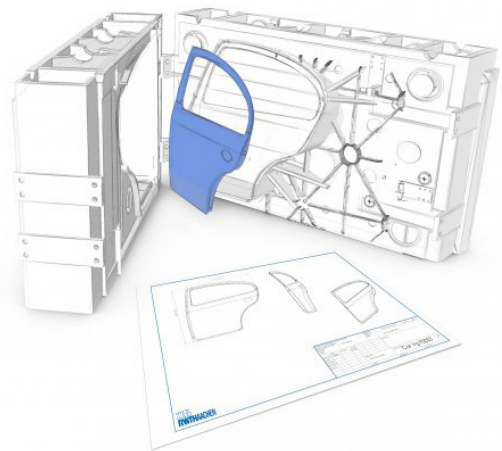
# About Us

## The WBA Tooling Academy – a multi-faceted partner for the tool and die industry – worldwide!

The WBA Tooling Academy is a spin-off of the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University as well as the Fraunhofer Institute for Production Technology IPT and was founded in 2010. The goal of the WBA was and is to promote and systematically develop the tool and die industry, a crucial sector for the high-wage country Germany. Since then the WBA has become the leading partner of the tool and die industry in the business areas of industrial consulting, further education and research. It is globally networked in science and business communities. New concepts and technologies are being developed and piloted at its unique demonstration tool shop on the RWTH Aachen campus. The focus is on application-oriented and interdisciplinary research through the close connection with member companies.

### Vision

Having started out with the goal of advancing and systematically supporting the industrialization of tool shops, the WBA is currently working on digitally networking the tool and die industry. The focus is on increasing the efficiency and effectivity of order processing for one-off production in a global value-creation network. In order to unlock the potentials of digital networking in the context of industry 4.0, it is the designated goal of the WBA to develop and implement practical and user-oriented solutions together with cooperation and research partners. Thereby, the tool and die industry will remain the flexible guarantor for innovation, productivity and reliability in the future.



### Mission

In order to spread the findings of the WBA from international research and consulting projects as well as consortial studies and own developments, these shall be made available to all companies and employees of the tool and die industry through different further education formats, print and online media and industry events. All content from all business areas needs to be synchronized and developed further to increase the satisfaction of different customers and strengthen the WBA brand nationally and internationally. As a result, the focus is on our excellently educated, versatile and flexible employees.

# Benefits for Companies

The WBA is the leading partner of the tool and die industry in the business areas of industry consulting, further education and research. In its own demonstration tool shop the WBA replicates the entire process chain of tool making and develops innovative solutions for the industry together with member companies. As a platform for the tool and die sector, the WBA and its employees create a connection between science and industry.

## Community

The network of the WBA is comprised of leading German tool shops from different industrial sectors as well as the most important suppliers with respect to materials, software and machine technology. The members nurture an intensive exchange about current and relevant topics in many events of the community. Reciprocal visits are also part of the community mindset.

## Demonstration Tool Shop and "Tooling Theme Park" ("Erlebniswelt Werkzeugbau")

The WBA can show its members and interested parties an outlook at the tool shop future with its unique infrastructure on the RWTH Aachen campus. Innovative technologies are presented with the aid of demonstrators and adapted for the tool and die industry through real use-cases. In this way, the digital networking of the tool and die industry can be witnessed live. Furthermore, the WBA is represented on various platforms of the BMBF and BMWi as a "Industry 4.0 Test Environment".

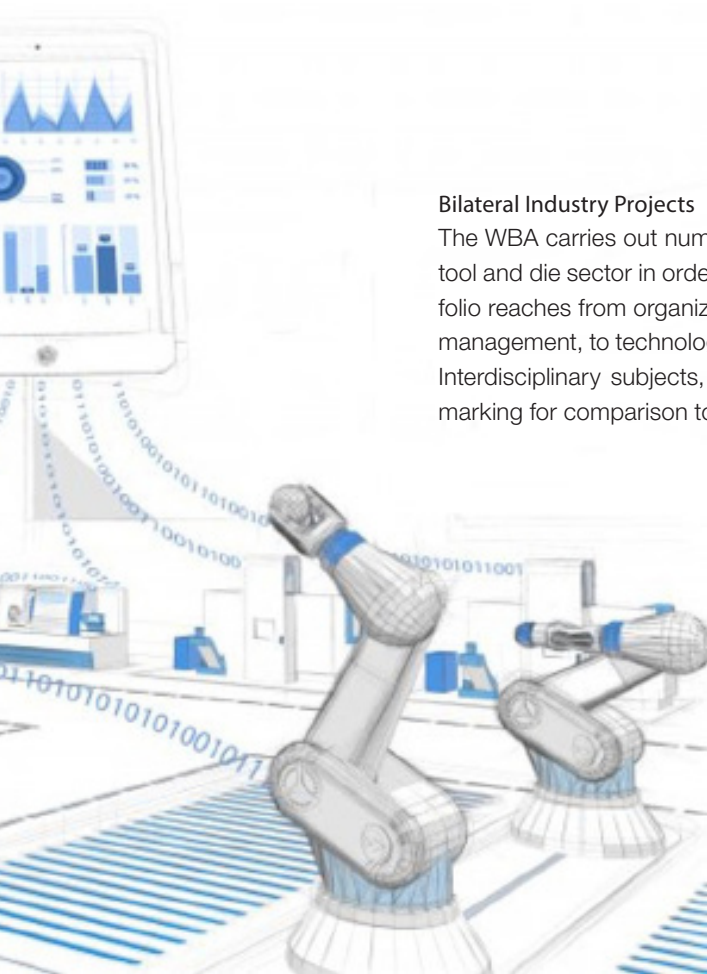
## Networking of Industry and Science

Through the physical proximity to renowned institutes of RWTH Aachen University and the Fraunhofer Society as well as the content-based connection to them, the WBA has access to innovative research approaches. With its unique infrastructure, problems can be solved with experts from many disciplines. Also, the WBA cooperates with research institutions and associations in nearly all countries relevant for the tool and die industry.

## Practice-Oriented Further Education

The distribution of topics and content to all companies of the tool and die industry happens through a wide range of further education formats. From events for trainees, to one-day seminars for specialists, to multi-day executive workshops, the WBA offers organizational and technological presentations, educational games and workshops with high practical relevance. Further, those interested can take certificate courses and obtain RWTH-certified degrees, such as the Expert, Senior Expert and Master Tool Making. Via webinars and in-house seminars, location-independent further education is also possible.





### Bilateral Industry Projects

The WBA carries out numerous bilateral consulting projects worldwide together with companies of the tool and die sector in order to address specific questions and comprehensively analyze them. The portfolio reaches from organizational topics, such as layout planning, planning and controlling and process management, to technological topics, which include technology selection and milling tool management. Interdisciplinary subjects, e.g. supplier identification and evaluation but also industry-specific benchmarking for comparison to competition, round off the portfolio.

### Publications and Studies

Every year, the WBA publishes a number of studies in the context of the tool and die industry. The two series “World of Tooling” and “Successful in the Tool and Die Industry” examine and evaluate relevant tool making countries as well as determining the success factors of an effective and efficient order processing in a global value-creation network. The studies include diverse topics of the tool and die industry and enable employees of tool shops build up new knowledge. Additionally, the WBA regularly publishes scientific articles in sector-specific magazines.

### Consortial Research Projects

In the WBA community, members and research institutes research together on organizational and technological topics of the tool and die industry. Every year, new consortia of tool shops are formed that are dedicated to one main topic and build up expertise in it, in order to use the obtained results in their own processes. This also facilitates an intensive exchange of existing best-practice solutions among the participating companies.

### Publicly Funded Research Projects

The WBA enables access to publicly funded research projects and maintains an intensive exchange with all relevant research bodies. This networking allows for companies, together with the WBA and further partners, to carry out promising research and development projects and pilot new products and technologies. Companies can profit from the extensive experience of the WBA in carrying out public research project as well as from the existing infrastructure.



# Thematic Focus

In order to promote the systematic development of the tool and die industry, the WBA is focused on different areas that increase the effectivity and efficiency of value-creation in a global network. Themes such as industrialization, digital networking, the use of intelligent products and offering innovative services are being concentrated on as important topics for the future.



## Industrial Tool Making

One-off production in tool shops challenges them in many respects, as standardization is only conditionally possible due to insufficient number of repetitions. However, through the industrialization of processes and structures, potentials can be discovered that make value-creation in the tool and die industry more effective and efficient. At the center of attention are topics such as focus, cooperation, product and process standardization as well as flow production and process synchronization.

## Smart Tools und Smart Services

Modern sensor technology and user-friendly software programs enable tool shops to intensify their contact with customers, even after the delivery of the tools. Through intelligent tools, data can be systematically analyzed and corresponding services offered, e.g. in the sense of predictive maintenance. This means tool shops can generate additional revenue and gain important additional knowledge from the implementation of tools in series production for manufacturing future tools.



## Tool Shop 4.0

The technological developments in the context of Industry 4.0 offer the potential to digitally network value-creation in the tool and die industry. Through the implementation of cyber-physical systems (CPS), tool shops are put in the position to create a digital shadow of their products and their shop floor. This enables learning via evaluations based on data as well as manufacturing tools at optimal costs and in optimal time.



## Benchmarking

The systematic comparison of a tool shop with its competitors allows for an actual determination of the capabilities of a tool shop. Through a comparison of organizational and technological figures with national and international competitors, the own competitive position can be determined. This means strengths and weaknesses can be identified, which can be targeted in improvement programs.



## Market Intelligence

Globalization has a considerable influence on the tool and die industry. Not only are customers internationally positioned, tool shops are increasingly opening factories or cooperating with local companies in markets where their customers are located. In order to overcome the challenge of internationalization, tool shops require extensive market intelligence to identify and evaluate customers, suppliers but also competitors on the respective markets. Every international tool making location needs local suppliers with which it partners up.

## Technological Developments

The increasing development of technologies utilized in the tool and die industry in the past years have led to significant increases in efficiency. The automation of single machines and the linking of different technologies reduces downtime and increases productivity. However, now the focus is on guaranteeing data continuity throughout the CAX chain and integrating innovative technologies that have never been implemented before, such as additive manufacturing, into the process chain.



## Organization and Process Management

The process chain of tool making is long and contains a number of critical steps. Numerous optimization possibilities exist within a defined layout, ranging from cost calculation to planning and controlling to manufacturing. The specific development and implementation of solutions to assist employees in their daily work is an important part of the CIP of companies and has to be systematically addressed. An agile organization structure has to be created for this purpose, which can be enabled through a systematic process management.





# Service Components

The WBA is the first and one of the largest centers in the Cluster for Production Technology on the RWTH Aachen campus. Through the proximity of the WBA to renowned institutes of RWTH Aachen University and the Fraunhofer Society, a unique network of research institutions and industrial companies has arisen. In the long term, it has the goal of giving the tool and die industry new ideas and thus continuing its development through close and innovative collaboration. The RWTH Aachen campus offers the ideal conditions for this.



## Affiliation

The WBA is part of the Cluster for Production Technology on the RWTH Aachen campus and therefore has access to a unique research landscape and infrastructure. The large number of companies and research institutions located there allows for the interdisciplinary solution of problems and guarantees innovation with high practical orientation. Furthermore, the clusters on campus form overarching areas of focus, which are filled with content from the respective centers.



## Research & Development

The goal of the WBA is the continual improvement of processes and technologies in the tool and die industry. Companies, research institutions and associations research together with the WBA at its own demonstration tool shop, which has its focus on the topic of Industry 4.0. The WBA is present on all known Industry 4.0 platforms of the BMBF and BMWi and offers interested parties the opportunity to develop, pilot and optimize Industry 4.0 application in a real test environment.







### Community

The community of the WBA is composed of a number of internal and external tool shops with different areas of focus as well as cooperation members, such as software providers, material suppliers and machine manufacturers. In this manner, real problems in the tool and die industry can be identified and discussed and interdisciplinary solutions found. As part of the community, you have access to consortial research projects and can make use of the infrastructure of the WBA on the RWTH Aachen campus.



### Further Education

The further education formats of the WBA are founded in scientific theory, practically relevant and user-oriented so that different target groups of a tool shop can be taught according to their needs. From one-day seminars to the unique degree course "Master Tool Making", the WBA offers organizational and technological certificate courses of RWTH Aachen University and enables academics and non-academics to partake in certified further education format at one of the most renowned universities in Europe.



### Services

Apart from the production of parts and prototypes in its own demonstration tool shop, the focus of services offered by the WBA lies in consulting tool shops in specific problems. With 50 bilateral consulting projects carried out worldwide every year, the WBA is the first contact partner for the tool and die industry and supports tool shops in increasing their capabilities in organizational and technological areas. Furthermore, the WBA manufactures parts and prototypes in job order production for customers from various industries with the help of the latest machines and technologies in its demonstration tool shop.

# Membership

The community of the WBA is composed of leading German tool shops and cooperation partners of the tool and die industry. The membership model is divided into Premium, Business and Basic members for tool shops and includes suppliers to the sector as cooperation members.

BASIC	BUSINESS	PREMIUM
<p>Basic members have access to events of the WBA community and to the yearly consortial research projects. They receive the annual research report and a discount of 30% on WBA seminars.</p>	<p>In addition to the basic services, business members get a 10% discount on consulting projects and can actively shape the topic selection of the consortial projects. Also, they get a 30% price reduction on all certificate courses/modules.</p>	<p>Beyond that, premium members have office space available to them for free. As well, they receive a 30% rebate on all further education formats of the WBA, including the Expert, Senior Expert and Master Tool Making degrees of RWTH Aachen University.</p>
<p>Project-check budget: € 5,000 p.a.</p>	<p>Project-check budget: € 7,500 p.a.</p>	<p>Project-check budget: € 10,000 p.a.</p>

## COOPERATION

Like all other members, cooperation members have access to the events of the WBA community as well as the annual research report. They profit from the exclusive location of the WBA and profit from a pertinent marketing effect. Included Project-check budget: –

### Premium



### Business








### Basic



### Cooperation



	SERVICES	PREMIUM	BUSINESS	BASIC	COOPERATION
 Affiliation	Project-check budget	€ 10.000	€ 7.500	€ 5.000	-
	Project-checks applicable to:	All activities	All activities	R&D projects	-
	Project-checks valid for:	5 years	3 years	1 year	-
	Office use	Yes	€	€	€
 Research & Development	Project prioritization	Yes	Yes	-	-
	Project selection and participation	Checks	Checks	Checks	-
	Annual report	Yes	Yes	Yes	Yes
	Access to publicly funded research projects	Yes	Yes	Yes	Yes
 Community	Semi-annual meeting at a member's location	Yes	Yes	Yes	Yes
	Annual meeting in Aachen	Yes	Yes	Yes	Yes
	Access to virtual campus	Yes	Yes	Yes	Yes
 Further Education	Degree program Master Tool Making	-30%	-	-	-
	Senior Expert Tool Making	-30%	-	-	-
	Expert Tool Making	-30%	-	-	-
	RWTH certificate course/module	-30%	-30%	-	-
	Seminars	-30%	-30%	-30%	-
	Webinars	Yes	Yes	Yes	Yes
 Services	Industry consulting	Checks/ -10%	Checks/ -10%	€	€
	Renting of space	€	€	€	€
	Access to demonstration tool shop	€	€	€	€

# RWTH Aachen Campus

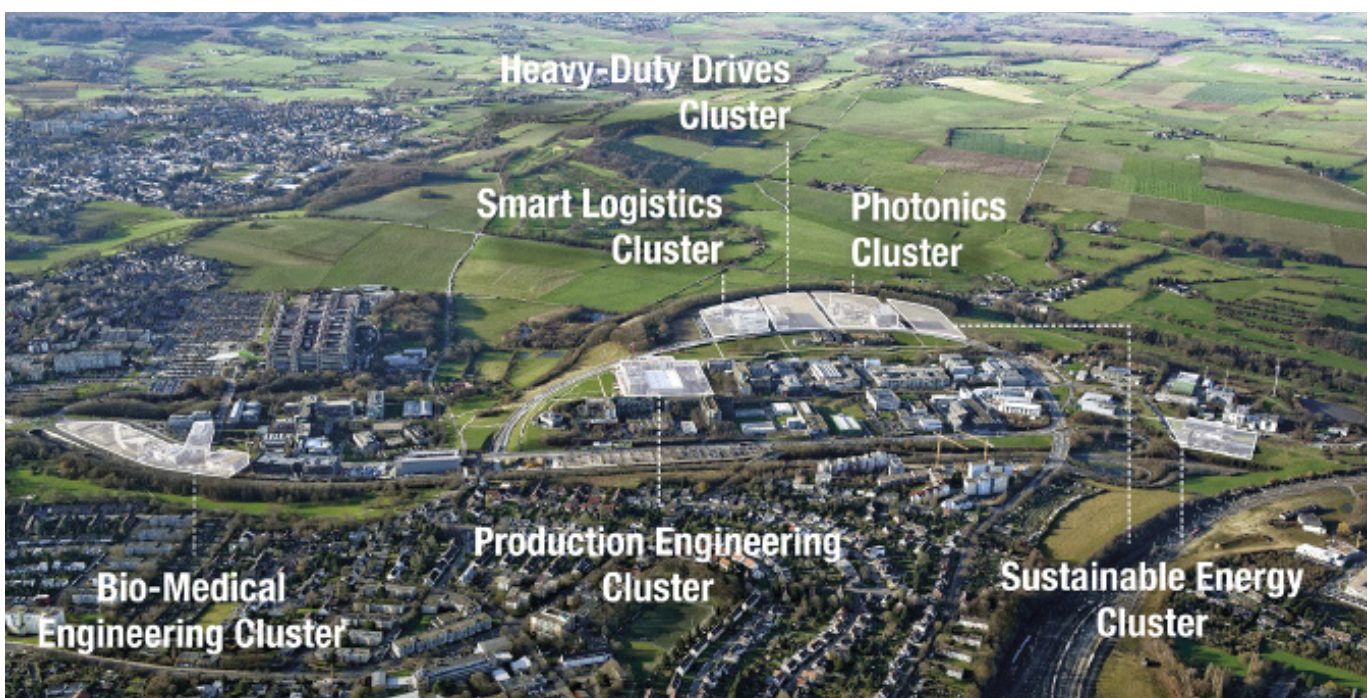
RWTH Aachen University is one of the leading technical universities in Germany. With its excellent researchers, it has all the required competences and experience at its disposal that are needed to find the answers to the challenges of megatrends. It recognized the necessity of interdisciplinary and consortial collaboration and started the RWTH Aachen campus project in 2009.

## Interdisciplinary and consortial research and development

Megatrends are changing the world and pose a challenge to all players. In order to remain competitive, science, industry and society are looking for solutions. Single scientific disciplines cannot find these by themselves anymore. Interdisciplinary cooperation is required. On the industrial side, companies often problems with bearing the cost for medium and long-term problems alone. Consortial collaboration paves the way for joint financing. The RWTH Aachen campus facilitates overcoming the traditional physical and institutional barriers – with strategically organized collaborations in integrative buildings, the spatial basis for consortia. Enrolled members share resources with university institutes, make use of synergistic effects and exchange their knowledge directly on-site.

## Research Needs Space

Campus Melaten and Campus West have space available for expansion of the campus project. In 2009 the building work started for the development of Campus Melaten, which is where the six starting clusters are located: Bio-medical engineering, sustainable energy, photonics, production technology, heavy duty drives and smart logistics. In the second step, the development of Campus West will take place. With the connection of both areas, a contiguous campus will be created that is integrated into public life. Located on approximately 800,000 m<sup>2</sup>, it is one of the largest technology-oriented research landscapes of Europe.





# Cluster for Production Technology



## The Cluster for Production Technology

The first research teams and industry partners moved into the Cluster for Production Technology at the end of 2016, which is largest building complex on the RWTH Aachen campus so far, with about 30,000 square meters. About 150 companies are already matriculated; up to 800 experts from production technology, the natural sciences, material sciences, mathematics and information technology are working together in interdisciplinary industry consortia. Professor Dr. Günther Schuh, the managing director of the cluster, has the goal of making companies agile through Industry 4.0. The focus of the cluster is on product development and production.

In the future, agile industrial companies are flexible, active, adaptable and show initiative. The requirement for reaching these capabilities is the networking of value-creation chains. People, machines, systems, logistics and products communicate and cooperate with each other. The data from classical information systems is complemented by additional data, usually collected via sensors, and create a transparent, virtual image of the real world. Assistance systems building on this information allows for the person responsible to make well-founded decisions.

Cyber-physical systems go a step further: complex, communicating groups of software, mechanical and electronic elements are able to perform decentralized tasks as autonomously as possible via a data infrastructure much like the internet. They are also described as learning, as they adjust and adapt to external influences. Only in exceptional cases, such as disruptions or a conflict of objectives, they turn to a higher authority, the employee. It should be noted that non-linear and social systems, like companies, cannot only be controlled by algorithms in the long-term. However, the Cluster for Production Technology is trying to come as close as possible to this ideal.

# Involved Institutions

## Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University



The WZL at RWTH Aachen University is a synonym for successful and forward-thinking research and innovation worldwide in the area of production technology. It carries out research projects that is both fundamental and oriented towards the requirements of industry in eight fields. Additionally, practice-oriented solutions for the optimization of production are worked out. With its four chairs for metrology and quality, production technology, manufacturing technology and machine tools, the WZL covers all subfields of production technology.

## Fraunhofer Institute for Production Technology IPT



The Fraunhofer Institute for Production Technology IPT in Aachen combines knowledge and experience in all fields of production technology. In the areas of process technology, production machines, mechatronics, production quality and metrology and technology management, the IPT offers its project partners and clients individual special solutions and immediately implementable results for modern production. In cooperation with the WZL and WBA, the IPT carries out benchmarking projects in the tool and die industry, which have a focus on the evaluation of the technological potential of tool shops.

## FIR (Institute for Industrial Management) at the RWTH Aachen University



The FIR is a non-profit, cross-industry research organization at RWTH Aachen University in the area of business organization and business transformation. The institute conducts research, qualifies, teaches and accompanies in the fields of service management, information management, production management and business transformation. As a member of the German Federation of Industrial Research Associations, the FIR supports research and development for international firms as well as small and medium-sized enterprises.

## Institute of Plastics Processing (IKV) in Industry and the Skilled Crafts at RWTH Aachen University



The IKV is one of the largest institutes in the research area of plastics processing. Throughout its 65 year existence it has built up great expertise in the areas of research and development in handling plastics. The tasks of the institute include scientific but also practice-oriented research in the field of plastics technology, training of students as qualified specialists for the plastics industry as well as practical training in plastics technology.

# Contacts



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## Sources

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