

limes international



The semester magazine for international partners, students, and parents No. 13, November 2014

- Theme: Mobility of the Future – From E- to Auto-Cars

Aalen Economics are Top

Study situation, support, and very good research

Innovation for the Mobility of Tomorrow

The Centre for Optical Technology introduces itself

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Dear limes international Readers,

in June, the first of our interactive exhibits for the State Garden Show in Schwäbisch Gmünd will be displayed; the second exhibit will be displayed in September and October. Under the motto “Taking Hold of Future Technologies” and “Optical Phenomena”, we will provide a small but exciting insight into some of the promising areas in which Aalen University is currently active. Exciting interactive stations, extraordinary exhibits, and amazing experiments are waiting for adults and children alike. Numerous research projects from Aalen University focus on the themes of the future – whether they be digital networking, mobility, lack of raw materials and energy efficiency, health, or robotics.

Professors and students form the future and society of our region and beyond.

The research will not be carried out behind closed doors. The transfer and exchange of know-how with business and science are very active. A big concern for us is to make science, economics, and art come alive and be understandable to the public. exphorhino , the workshop for young researchers at the University, is making a significant contribution. Numerous events, such as Day and Nights at the University, Technology Day, and the Girls’ and Boys’ Day bring together the themes of the future to the young and the old and make them more understandable.

Prof. Dr. Gerhard Schneider
Rector of Aalen University





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theme

Mobility of the Future – From E- to Auto-Cars

Trend researchers worldwide have 20 to 25 megatrends identified which relate to automobile manufacturers. Increasing environmental awareness with stringent CO2 regulations on the part of lawmakers, digitization, and increasing urbanization have led to the greatest upheaval phase for the automotive industry in 50 years, with major technological advances. This upheaval has long been heralded.

This article focuses on future technologies relating to mobility, electric mobility, and autonomous driving.

A silver bullet for the reduction of CO2 emissions from vehicles is quickly becoming effective – despite the doomsayers, the hype is over – hybrids, fuel cells, and natural gas can all move aside for electric drive.

Cars that can be charged with electricity are an alternative, because they use energy much more efficiently than the conventional combustion engine and

produce, at least where they are travelling, no emissions. Above all however, it is possible for them to run entirely without emissions when they are charged using renewable electricity from wind power, hydroelectric, or photovoltaics.

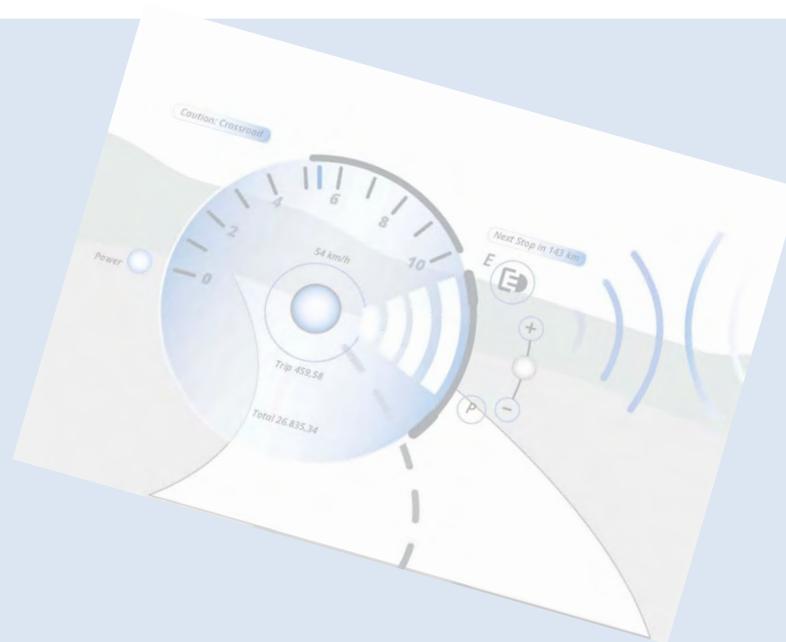
More and more manufacturers are moving from the brake to the accelerator. Especially since the topic is now being pushed forward in some countries by the government. In Norway the current market leader, the premium Tesla Model S, which costs over 70.000€. The rapid rise of newcomer brands like Tesla is forcing traditional premium manufacturers to now supply electric drive variants. In particular, BMW is offering the i3.

The two biggest obstacles to the mass market are scope of awareness and price. “The core elements of a successful business model in E-Mobility are competitiveness with conventional cars in cost and pricing, a comparable scope of action, and sufficient public perception of the electric car user’s public charging infrastructure,” says Prof. Dr. Anna Nagl, Head of the Competence Centre “Business Models: Energy for Future-Oriented Mobility” at Aalen University. The question of energy storage is crucial and employs numerous researchers worldwide.

Better batteries and efficient motors for electric cars

Lithium-ion batteries and fuel cells already provide power to electric and hybrid vehicles. Especially for lithium-ion batteries, there have been considerable improvements in performance and price. Over the next ten years more progress will be made in energy storage which will make it possible to offer electric vehicles at competitive prices.

Then people will have the good conscience of driving an emission-free car at no extra cost. Moreover, the progress in efficient energy conversion will contribute to this development. Efficient energy converters, such as those required in the drive trains of electric vehicles which require powerful, cost-effective, and durable magnetic materials with a minimum of expensive rare earth metals.



Experts predict a market share of 10 percent for electric cars in 2020 (currently 0.2 percent). In addition to purely battery powered vehicles, which are ideal for urban mobility, plug-in hybrids will evolve to be one of the most

And all with a smaller and cheaper battery than a pure battery-powered vehicle,” explains Prof. Dr. Moritz Gretschel, who holds the Chair of Electric Mobility at Aalen University.

„Autonomous cars can save 40 percent fuel in traffic jams“

important mobility solutions: “For daily driving distances like a commute, they rely on all-electric power, while an internal combustion engine takes away range anxiety and also allows more trips.

The computer will be our chauffeur

More and better assistance systems are paving the way for self-driving cars. In society we are waiting for the greatest revolution in traffic history.

The auto-cars are supposed to be safer than conventional cars, consume less fuel, cause less frequent traffic jams, and gain their users more time – which are, in any case, the hopes of the industry’s developers and researchers. Much as smartphones are simply phones without cords, self-driving vehicles remain merely a means of locomotion, but will completely change traffic.

“Fully Automated” does not mean that a vehicle actually takes care of all conceivable situations alone. The first fully automatic cars are merely driving on highways where traffic is relatively manageable. In cities more difficulties present themselves.

Computer scientists however, are already working on software that will automatically detect and predict the movements of pedestrians. They are trained with hundreds of images and movement data from real traffic. They learn, for example, that pedestrians will not suddenly accelerate to a car’s speed at a traffic light. Even if pedestrians are temporarily obscured, the software predicts their presumed position.

Cars are rapidly becoming mobile communication platforms. Their data nodes continually record, process, and even contribute large amounts of data and information from their environment – another way that mechanised road users will be able to maintain “eye contact”. Autonomous cars can communicate information about right-of-way, warn of obstacles, or form dense columns through radio interface.

The direction for the future of mobility can be seen: Electric cars will not displace combustion from the market, but they will make their own place. Autonomous driving and digitisation will provide more safety on the road. These future technologies will make the car safer, cleaner, more economical, and more intelligent.

Future trends are reflected in research and in teaching: Many professors, academic staff, doctoral students, and students are working on projects to promote mobility. Even the student racing team from the university, E-Motion, relies on e-mobility and is starting an electric car at the Formula Student Electric (see www.emotion-rennteam.de).

■ **Monika Theiss**
Head of Communications Department



In the photo from left: Andreas Kolb and Axel Woisetschläger, both directors of understood; Franz Loogen, Director e-mobil BW, Stuttgart; Prof. Dr. Anna Nagl; Lord Mayor of Aalen, Thilo Rentschler; Hans-Peter Weber, Spokesman of the Board of VR-Bank; Andrea Meyerdierks, research assistant “Business Model GREENOSTALB”; Helmut Speißler, Head of Corporate Services VR-Bank Aalen

Innovative Project: „Business Model GREENOSTALB“

The Ministry of Science, Research, and Arts of Baden-Württemberg founded the project “Innovation Project Business Model GREENOSTALB” with the goal of linking renewable energy with sustainable mobility in the Ostalb region. This makes it a very interesting project, especially from an ecological standpoint, but also its financial aspects are interesting, with self-generated green energy able to charge an electric car through a normal household outlet.

“Business Model GREEN OSTALB” has been studied in a citizen survey to determine the interest and willingness of Aalen’s population for charging electric cars with green electricity. The results of this survey show that the population of Aalen accept electric mobility with an open mind:

Over half of the respondents would consider electric driving for their daily commute of up to 25km. For this route, the range of electric cars is already sufficient at present. In addition, the high approval of charging electric cars with energy from renewable sources met with high approval from Aaleners. For this, of course, green energy will need to be generated, for example, with photovoltaic cells. To find out if the conditions could be met, Aaleners were asked in the questionnaire about their home and parking situation. Result: about half of the respondents have, regardless of home ownership, a socket in place for a car.

At the first Advisory Board meeting of this innovative project in late March, the logo was presented. It was developed by the Aalen advertising agency “understood”. The exclamation mark “GO!” is composed of the initial letters of the project name and the words “GREEN OSTALB”. The logo reflects the successful linking of renewable energy with sustainable mobility reflected in the Ostabl region. The designer, and graduate of Aalen University, Axel Woisetschläger developed a simple, striking logo that will in the future be displayed on the electric cars of project partners.



- **Prof. Dr. Anna Nagl**
Head of Competence Centre “Business Model for Future-Oriented Mobility”

More Efficiency, Range, and Emotionality for Electric Cars

“Electric mobility is more than a purely battery-driven vehicle”, is the conviction of Dr. Moritz Gretzschel, Professor of Electrical Mobility at Aalen University since 2012. “We will see in the coming years and decades, a healthy mix of battery-powered vehicles, hybrids, and plug-in hybrids – and of course focus on pure combustors. Everything where it makes the most sense.”

Besides in Bachelor’s and Master’s programmes at Aalen University, Prof. Gretzschel teaches electric mobility in the part-time master degree programme “Electromobility” of the Southwest University Federation. In this alliance of several Baden-Württemberg universities, Gretzschel represents Aalen University and is responsible for the “Drive” and “Display and Operating Concept” modules.

This is also reflected in several current research applications, “The first-generation electric vehicles have become normal, but the range is still disappointing. In the second generation, we therefore still need to take more care to obtain higher energy efficiency, when the energy storage cannot be made larger.”

A theme is therefore, to recover more energy – electrical, mechanical, and thermal – and to link them to the vehicle’s energy flows. Thus, energy consuming nonsense such as simultaneous cooling and heating of different components can be avoided in the future. Another project deals with the emotional appeal of the electric vehicle on all sensory channels, and even moreso to make it easier for the driver to drive intuitively and more efficiently, and to achieve a higher range.

■ gretz

High Performance Magnets and Lithium-ion Batteries in Focus

Four years ago, Prof. Dr. Gerhard Schneider, Prof. Dr. Volker Knoblauch, PD Dr. Dagmar Goll, Dr. Alwin Nagel, and Dr. Timo Bernthaler founded the Institute for Materials Research (IMFAA) in the Degree Programme Surface Technologies / New Materials. With this, the researchers combined their research activities and competences under one roof. “This offers an enormous amount of synergy in daily research work, in the optimal usage of the laboratories and their further development, as well as the acquisition of research projects”, says Rector Prof. Dr. Gerhard Schneider.

Research themes for Electromobility are, for example, new high-performance magnets for energy storage in electric motors and generators, multifunctional composites for high-performance electronics or aging-resistant lithium-ion batteries.

With these projects, Aalen University takes a state-wide pioneering role. The research focus points at the institute are on the application and further development of methods for materialography, as well as the fields of composite materials, magnets, and battery materials.

With electric mobility and renewable energies, the researchers edit the latest topics with increasingly high economic and social relevance. “Not least, this also provides the opportunity to train students in areas that offer the best future job and career opportunities – both in industry and in research,” explains Schneider. The research activities of the Institute are strongly application-oriented, in keeping with the spirit of universities of applied sciences.

In the field of lithium-ion batteries, research is underway to better understand the aging mechanisms that shorten the lives of expensive batteries. It is also examining how batteries can be tested faster to make them ready for vehicles more promptly. Magnetic materials with higher energy densities and hard magnetic alloys with reduced rare earth metals for energy conversion from electric motors or generators are also explored. In the field of composite materials made of ceramics or metal, the IMFAA is working to develop novel circuit support for efficient cooling of power electronic modules with improved thermal management and high thermo-mechanical reliability.

Under the roof of the IMFAA are around 30 employees and a further 23 students who work as research assistants – with a tendency to rise. Through extensive and nationwide pioneering research projects, the institute and the degree programme Surface Technology / New Materials can offer attractive topics for student projects – be it as a research assistant, through study or a thesis, or even a dissertation in collaboration with one of the many universities with which the institute cooperates. ■ IMFAA

Racing Fever – Electric Motors for Motorsport

In motorsports, the electric drive has gained a foothold and puts its advantages compared to internal combustion engines to the test. Mention may be made of clutchless starts and lack of a manual transmission. The Laboratory for Electrical Drive Technology and Power Electronics at Aalen University boasts two projects focusing on this topic.

When commercially available electric motors in the Motocross bike eKrad were not up to the rigors of the terrain and “burned out”, a team led by Prof. Dr. Heinrich Steinhart, at the company’s request, developed, constructed, and tested an electric motor for the eKrad.

This gives it a peak power of 50kW and lets the motocross bike accelerate to a speed of 120km/h. At the moment, five bikes, in the truest sense of the word, are racing – but the construction of more motorcycles is planned. And the staff in the Laboratory for Drive Technology and Power Electronics are burning with enthusiasm. Their new goal is to develop a complete drive system of power electronics and an electric motor for a

go-kart. “The motivation for this second project was to use our knowledge in the field of electric drive technology to develop, together with the students, something whose functionality makes the acquisition of knowledge fun,” says Swen Bosch, a research associate in the laboratory. In the context of several sub-projects of the interdisciplinary development process is driven forward. Special attention is paid to regenerative braking – recovery of braking energy into a storage battery.

Thus, the range of the vehicle can be increased. Other challenges are to find the appropriate energy storage technology and realize the motor control using power electronics and modern signal processor technology. To validate the functionality of the overall system, a variety of measurement data are analysed in the aftermath. Students will gain a deep insight into the topic of electric mobility and simultaneously be introduced to scientific papers.

■ sr

More information can be found at:
www.stz-al.de and www.ekrad.de



Aalen Economics are Top in Germany

Both management science degree programmes at Aalen University – International Business Administration (IBW) and Business Management for Small and Middle-Sized Enterprises (KMU) – have achieved excellent results in this year’s CHE University Ranking, and have placed, in the field of business administration, in the very top group of the top seven universities of applied sciences in Germany. The industrial engineers also scored well and were ranked in the Nationwide Top 20.

The university rankings of the Centre for Higher Education (CHE [*Centrums für Hochschulentwicklung*]) regularly compares more than 300 universities and colleges in Germany, Austria, Switzerland, and the Netherlands. In 2014, around 200.000 students and 15.000 teachers participated in the CHE survey for their universities, ranking them in such fields as value of studies, support from teachers, international orientation, and practical orientation / professional reference. The results have now been published, and are very pleasing to Aalen University.

“We will continue to improve our quality. This will pay off”, says Rector Prof. Dr. Gerhard Schneider. The biggest success of the Faculty of Economics in the CHE Ranking, is that it also leads to the comprehensive services offered by the university, such as the Centre for Fundamentals, the International Centre, the Central Student Service, or the Central Academic Advising STUDIO. “Those who study with us, will be studying at a high level – and will be assisted and encouraged from the beginning”.

“Aalen is great in business! For all criteria, except for e-learning, we are in the top group, reflecting what have been for years, our high quality course offerings Business Management for Small and Middle-Sized Enterprises, and International Business Administration. What particularly delighted me were the excellent results in the category of practical orientation / professional

relations, in which we occupy second place nationwide,” says Prof. Dr. Ingo Scheuermann, Dean of the Faculty of Economics. “We have been continuously working on improvements and see this as an incentive to just keep going. The results for the industrial engineers are also very encouraging.”

The three degree programmes of the ranked faculty are distinguished primarily by top results in the areas of academic feasibility, support from teachers, IT equipment, and library services. Compared to the results from three years ago, both business programmes have improved in other areas, enabling them to reach the top group in every category except e-learning.

The strengths of the International Business Administration degree programme lie in an individual profile building. “It is a great honour for us to be recognized with International Business as one of the best programmes. The ranking reflects the strength of our programme and the increased opportunities for focusing on the individual profile education of our students”, says IBW Dean

Prof. Dr. Alexander Strehl. The career opportunities resulting from the course-related internship semester abroad, the possibility of studying at a partner university abroad, as well as the integration of intercultural teaching content in numerous lectures are very good.

In the degree programme Business Management for Small and Middle-Sized Enterprises, social methods and skills are taught alongside academic competencies, which contributes significantly to a practice-oriented training for the needs of a small or medium business. “Coupled with integrated practice elements, as well as applied research, the SME programme is characterized by a sound doctrine,” says Prof. Dr. Ralf Harting, dean of the degree programme. The numerous opportunities for specialization at the end of this programme form the basis for a successful career and excellent career opportunities.

The Industrial Engineering degree programme combines both a sound basis and deeper learning in subjects ranging from

engineering to economics. This requires a high level of discipline from students who have to study both subjects at an advanced level. “The satisfaction of our students is very important to us,” says Prof. Dr. Sascha Röck, dean of the degree programme Industrial Engineering. “We are pleased that this has been clearly confirmed by the ranking.

We invest in a hands-on training on a stable base foundation. The structure of the programme is constantly put to the test in order to react to the high demands of the labour market.”

Aalen University and the courses of study in Economics are pleased with the very good ranking results. In order to strengthen the already recognized high level, measures to further optimize the programmes have been launched.

The results of the current CHE University Rankings can be found starting May 6th, 2014 in the new ZEIT-Study Guide 2014/15 or online at this [link](#).

■ [id/ mack /buc](#)

Kreissparkasse Supports Innovation Centre with 185.000 Euro

(From left) Chief Executive Officer of Ostwürttemberg Chamber of Commerce Klaus Moser, District Administrator Klaus Pavel, Sparkasse Chief Carl Trinkl, Innovations Manager Gerhard Subek, Lord Mayor Thilo Rentschler, and Rector Prof. Dr. Gerhard Schneider are delighted with the generous support



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Sparkasse Chief Carl Trinkl has promised to support the Innovation Centre Aalen for the next three years with a donation of 185.000 Euros. Innovation Manager Gerhard Subek accepted the symbolic cheque in March of this year together with District Administrator Klaus Pavel, Rector Prof. Dr. Gerhard Schneider, Lord Mayor Thilo Rentschler, and Chief Executive of IHK Ostwürttemberg, Klaus Moser.

“Through their support, Kreissparkasse Ostabl has helped Aalen greatly strengthen its reputation as a business location. We see ourselves as important networkers between the University and regional businesses. With the help of Kreissparkasse, we can better meet this task,” says Gerhard Subek. With the promised support of the Innovation Centre, Kreissparkasse has set a stimulus for the development of creative ideas. Lord Mayor Rentschler also emphasised the strong connection of the project to the SME sector and to the region. The first three founding teams have already gone to start at the Innovation Centre.

■ aa

research



(From Left) Manuel Araujo (student), Leonhard Hitzler, Prof. Dr. Markus Merkel, Enes Sert. Not Pictured: Stephen Burger

From the Lightness of Being – Innovation for the Mobility of Tomorrow

Design and simulation are central to the teaching and research activities of Prof. Dr. Markus Merkel from the Degree Programme of General Engineering at Aalen University. For around ten years, Prof. Dr. Merkel has been in Aalen and since 2006 at the Centre for Virtual Product Development (CAD Centre).

For his long and special commitment to research, Prof. Dr. Markus Merkel received the University's Research Award last year. Since the beginning Prof. Dr. Merkel has steered his courses in the direction of his research activities.

After studying production engineering at the University of Erlangen-Nuremberg, he earned his doctorate at the Department of Engineering Mechanics with a thesis entitled "Parallel, efficient algorithm for the 3D boundary element method." Subsequently, he worked for about six years at the International Technical Development Centre of Adam Opel AG in Rüsselsheim, and worked with their key activities of simulation, durability, and vehicle acoustics.

Since September 2004, Prof. Dr. Merkel has been a professor and researcher at Aalen University. Several projects of his working group have been funded by various state and federal ministries (BMBF, BMWi, MWK), and the Baden-Württemberg Stiftung, and have received over 1 million Euros in funding. These project results in more than 20 scientific publications.

The working group is currently comprised of six academic staff. In addition, students can participate to be introduced to scientific work within the framework of bachelor and master theses. International research collaborations exist with Griffith University in Australia, and with Santa Catarina State University in Brazil.

Prof. Dr. Merkel had great success last year in expanding the university's equipment pool. This allows new research topics to be developed and ongoing projects with new elements can also be added. Likewise, students now have the opportunity to carry out their study work with the most modern equipment. Thus, a high-quality system for selective laser melting (3D metal printer) from SLM Solutions from Lübeck was purchased with funds from the federal programme FHIInvest and put into operation recently.

This machine allows raw materials to be built up in layers into almost any geometric shape to form three-dimensional work pieces. The other participating professors, Uwe Berger (Rapid Prototyping), Rainer Börret (Centre for Optical Technology), and Dr. Lothar Kallien (Foundry Technology Aalen) want to use the new facility to provide innovative integral components in the field of printing and injection moulding technology, traffic engineering, and medical manufacturing.



(From Left) Prof. Dr. Markus Merkel, Christoph Janousch and Prof. Dr. Uwe Berger

The system is to be introduced to a wider audience in the second half of the year, as part of a colloquium. In addition, a new dynamometer was funded by the Instruments Programme of the State of Baden-Württemberg.

This can be used in the drive trains of electric vehicles to measure data such as performance, durability, acoustics, and brake energy, all of which can then be analysed and compared in simulation. This can then be optimised to derive the best operating strategies for the vehicles.

Cellular metals as lightweight materials

Metallic hollow sphere structures are part of the cellular materials group. They stand out among others through their low density and high specific stiffness, thermal insulation and high energy absorption. They are not widely used due to their high production cost and the elaborate design and dimensioning of their components and systems.

It is precisely here that Prof. Merkel's working group is focusing, to attempt to toughen the material for various applications in machine and plant engineering.

Funding was obtained through the project "LASERHKS", which was funded by the Baden-Württemberg Stiftung to develop new laser processes for cutting, welding, and drilling into the new material.

While AG Merkel performs the optimization of the processes by means of numerical simulation, the results must always be validated in the Laser Application Centre of his colleague Prof. Dr. Harald Riegel.

New drive modules for e-mobility

In the field of vehicle technology, Merkel's working group is involved in the BMBF joint project "Scalable modules and drive axle for electric mobility" (ESKAM). The goal of the project is to develop an electric drive unit which consists of two electric motors with power electronics and a mechanical transmission as a scalable model, which can then be installed flexibly in different axes for different requirements.

Merkel's working group has taken over the integration of the individual components in the drive module. In this case, the ability to work in series is a special challenge.

Research and development in the region

Several projects of the working group are carried out in cooperation with SMEs and make valuable contributions to technology transfer within the region. For example, within the scope of two projects that were provided funding by the Central Innovation Programme for SMEs (ZIM), as well as by the university and companies, new production systems were developed.

A new modular, flexible tool system for the processing of wooden windows and doors was developed in cooperation with Oppold System International GmbH of Oberkochen. With KMS Metall GmbH in Hüttlingen, a clamping system for low-stress tensioning of flexible components without deformation is being developed.

■ **Dr. Ralf Schreck**
Research and Transfer

Magnet materials research wins the Prize of the Research Organization for Drive Technology

Magnetic materials are of great importance for electric mobility and energy transmission. They are used, for example, for electric motors, electrically powered vehicles, or wind power generators for generating energy for use and contribute to efficient energy conversion.

At the Institute for Materials Research at Aalen University (IMFAA), Prof. Dr. Gerhard Schneider and PD Dr. Dagmar Goll's working group research optimization and further development of these materials for their application in electric drives. The project (briefly called "Power Magnets"), has been funded since October 2010 by the Federal Ministry of Economics through the AiF Programme "Industrial Community Research of the German Engineering Federation" (VDMA).

It was presented at this year's Information Session of the Research Association for Drive Technology (FVA) in Würzburg, where it was awarded second place out of 65 projects presented. The prize, which comes with 1.000 Euros, was awarded to Dr. Dagmar Goll, who introduced the project there.

The Power Magnet project has the goal of reducing the use of rare earth metals in magnets to the minimum possible without compromising the performance of the magnets, thereby saving costs.

In particular, the influence of the structure of NdFeB (Neodymium-Iron-Boron) super magnets on their magnetic properties needs to be better understood.

With the participation of leading companies like Daimler, BMW, VW, and the magnet industry, a demonstration magnet is being manufactured to be installed and tested at the end of the project (Spring 2015) in an electric motor. The project is being carried out jointly with the Karlsruhe KIT and the Technical University of Darmstadt.





current RESEARCH

Top position in research reached again

In the past year, the researchers of the university were not only very active in the national comparison, but very successful. Under the reporting requirements for funds raised, research funds, publications and patent applications, as well as doctorates of the universities of applied sciences in Baden-Württemberg must be reported annually.

The central analysis revealed that Aalen University again in 2013 prevailed in comparison to other universities, including the powerful universities of Mannheim, Karlsruhe, and Offenburg. Rector Prof. Dr. **Gerhard Schneider** commented: “The special use of research-based fellows in the last year has paid off again, and again we took the lead.

However, the other universities are gaining ground. In 2013, Aalen was attracting new research infrastructure, such as equipment and staff in order to make its research activities sustainable and to open up new fields of research. Now it is important to introduce professors who are not or only recently active in research at the university to the possibilities and to inspire them”.



current RESEARCH

New projects of the Industrial Research Community

New cathode materials for lithium-sulphur batteries are the focus of a new research project, which is being carried out within the framework of the Industrial Research Community (IGF [*Industriellen Gemeinschaftsforschung*]) through the Federal Ministry for Economics and Technology, who is funding it for 30 months.

Through the project, the characteristics of the batteries should be significantly improved. Prof. Dr. **Timo Sörgel** from the Department of Surface Technology / New Materials of Aalen University is leading the project in collaboration with the Research Institute for Precious Metals and Metal Chemistry (fem) in Schwäbisch Gmünd.

In another IGF-funded project, Prof. Dr. **Lothar Kallien** of Foundry Technology Aalen is cooperating with the Institute of Materials Engineering in Bremen. In the project, with a term of three years, the methodology for die cast aluminium components, such as are used for drive technology, should be advanced. Targeted heat treatments, material saving, as well as higher loads during operation should all be possible.

Fresh PhD

With „magna cum laude“, **Svenja-Catharina Bunz** has completed her Doctorate of Natural Sciences at the University of Jena. Her dissertation, entitles “Capillary Electrophoresis-Mass Spectrometry for the Identification of Aminopyrene Trisulfonic Acid Labelled Glycans” was conducted at Aalen University in the laboratory of Prof. Dr. Christian Neusüß from the Faculty of Chemistry and co-supervised by Prof. Dr. Gerhard Scriba of the Faculty of Biology and Pharmacy, Friedrich-Schiller-University Jena.

The subject was a detailed characterization of sugar structures, as they occur in many portfolios of biologic pharmaceuticals. As part of her work, Svenja Bunz has completed several extended stays with cooperation-partner Merck Serono in Rome, and experienced there first-hand research in a large pharmaceutical company. Her professional future is definitely secured; she recently took up a position for a manufacturer of analytical instruments.

Compilation of the messages and contact: [Ralf Schreck \(Research & Transfer\)](#)
Ralf.schreck@htw-aalen.de



Dr. Svenja-Catharina Bunz

international

University constantly pursues internationalization

HR professionals are increasingly using the sentence “Foreign experience is a mandatory requirement” – especially if the firm operates internationally. And let’s be honest: Which student doesn’t have a particular company in mind, of which only the least are not internationally active, of the so-called “hidden champions” who are industry or world leaders in their respective fields? Both types of companies, in any case, pay particular experience to experience abroad.

Whether this experience is collected during the course of the studies or an internship abroad plays,

according to the head of the Junior Management Programmes of the company Bosch, Nicolet Eglseder, only a minor role.

The fact is, that with international experience during their studies, students can have a significant advantage over competitors who boast no experience abroad. This includes language skills acquired abroad, as well as the ability to adapt to new living conditions in a foreign country, and of changing work situations. The Trendance Institute, which

focuses their studies on Germany's Top 100 Employers, notes that in the case of a successful time abroad, HR can include their own opinions on whether a candidate will have a good deal of initiative, independence, and increased teamwork. "Skills that every business wants from its employees". Nicolet Eglseder knows that the company Bosch makes the list due to its acquisition of candidates with social skills, such as intercultural knowledge, mobility, and readiness paired with flexibility.

These properties are promoted by Aalen University in its students through special measures – in addition to the assistance provided in internships abroad by offering study abroad programmes together with its partner universities in other countries.



Picture 1: Prof. Kümmel at the Kick-off Meeting for the new TEMPUS EU Project "LLAF" together with Dr. Ariela Gordon-Shaag from Hadassah Academic College, Jerusalem and Prof. Dr. Joan Gispets from the Universidade Politecnica de Catalunya, Terrassa/Barcelona

For the Bachelor programme "International Sales Management & Technology" has, as the result of an EU project, recently been created as a dual-degree programme with the Belgian partner university KAHO Sint Lieven in Ghent. Identical agreements will be sought with other project partners in Lyon, France; Suceava, Romania; and London, United Kingdom. Double degrees are also an issue on the Master level.

In addition to a dual-degree cooperation with French "Grande Ecole" France Business School, more opportunities will be sought for students of the "Computer Controlled Systems" programme with Ukrainian partners Kharkiv National University of Radioelectronics. "Advanced Materials and Manufacturing" cooperates with Russian partner university Kalashnikov Izhevsk State Technical University, and "Polymer Technology" is working together with Thai partner university King Monkut's University of Technology North-Bangkok.



Picture 2: To mark the Kick-off Meeting in Porto of the new TEMPUS EU Project "LLAF", seven Israeli partner universities as well as the Vision Sciences Master and IRO staff visited the Kadoorie Synagogue, home to Porto's Jewish community.

At the Bachelor level in particular are many university partnerships in the United States. Among others, since the study conditions for “mainland” students in the British Isles and Ireland have become unfavourable due to high tuition prices. Aalen University is therefore determined to expand their existing partnerships in the United States. Thus those interested can study, for example, at Pacific University in Forest Grove, Oregon not only Optometry, but also Business.

As part of the new partnership, the university is also attempting to acquire additional courses without tuition fees for their students. A new partnership in the field of Economics was created with California State University, Fullerton. Further collaborations are currently being discussed by two universities in South Dakota, which will include some Engineering courses as well as Business. Discussions are also being held with a university in Texas.

Altogether, there are existing partnerships in Kansas, Maine, Massachusetts, Ohio, Oregon, and Pennsylvania, all with attractive universities. Of course there are “arrangements” with regards to tuition fees, since the most attractive locations are not be free of cost. The foreign partner universities expect in return, appropriate study opportunities for their students, as their students continue to pay a high fee to their home universities while in Aalen. Therefore, these students will only come to Aalen if they can receive a sufficient number of credit points. This in turn means that the faculties must offer many English-language courses, as only a few exchange students understand lectures given in the German language. A relatively large amount of Aalen students want to participate in English language lectures during their semesters abroad. Therefore, it is necessary to provide the foreign partner universities special programmes for their



Picture 3: International Business student Hoang Trang Tan (left) who participated in the “Short Programme” at the State University for Social and Economic Sciences in Saratov, Russia in April, seen here in May with a PhD student from Saratov together with American students who participated in the “Short Programme” at Aalen University.



Picture 4: Rector Prof. Dr. Sergey Y. Naumov opens the 2014 “Short Programme” of Aalen University’s new partner university in Saratov, Russia, with the participation of an International Business student.

students, so that the exchanges are approximately balanced. Thus, in Summer Semester 2014, a so-called “Short Programme” was offered to American and Russian students, which includes company visits and a cultural programme in addition to lectures. In addition, some degree programmes populate their networks with other foreign partners. Thus, they can offer more opportunities to gain valuable international experience for future students.

This works in an outstanding manner in the context of EU funding programmes, such as recently for the Master in “Vision Science and Business”: The programme was run jointly with the International Relations Office in the context of a new TEMPUS project to make new contacts and deepen existing ones – with seven partner universities in Israel, and other partners in Ireland, Latvia, Austria, Portugal, and Spain.

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Picture 5: Rector Schneider with his counterpart Rector Prof. Dr. Stepan Melnychuk (right) and the Head of the International Office, Serhij Lukanjuk of the Ukrainian National Jurij-Fedkowskytsch University in Chernivtsi on the occasion of the 50th Anniversary of Aalen University and the signature of a cooperation agreement between the two universities.

This works equally in the other direction of internationalisation, namely “Internationalisation at Home”, to increasingly confront domestic students with other mentalities and cultures, and in this way to contribute to and promote social skills. In this context, further bilateral partnerships were established in the past few months, with the National Yuri Fedkowskytsch University in Chernivtsi, Ukraine and with the Georgian Technical University in Tbilisi. Both are, like Aalen University, members of the European University Association EUA.

Other partnerships exist with the State University of Social and Economic Sciences, in Saratov, Russia, Brazil’s Universidade do Estado de Santa Catarina, Florianopolis, and with the Chinese universities Southeast University in Nanjing, and Jiaotong University in Shanghai – all highly renowned universities. Most of these new partner universities will be sending their first students over to Aalen for Winter Semester 2014/15, and thus increasing the international flair of the university.

■ Pascal Cromm

Director International Relations

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Picture 6: After successful completion of the EU project TOM, a double degree in the programme of International Sales Management & Technology is possible with Belgian partner university KAHO Sint Lieven, in Gent. Similar possibilities are being discussed with partners from Lyon, France; Suceava, Romania; and London, UK.

Material Research in Brazil

Dr. Timo Bernthaler from the Institute for Materials Research in Aalen (IMFAA) presented his research activities and teaching concepts of metallography and material technology in Brazil. The three-day microscopy meeting was held in the resort town of Caxambu. The IMFAA activities for computed tomography and correlative microscopy were presented by Dr. Bernthaler in the session “Materials Characterization – From 2D to 3D and Beyond”.



Continuing cooperation at Aalen Material Microscopy Day: Dr. Timo Bernthaler (left) and Sidnei Paciornik

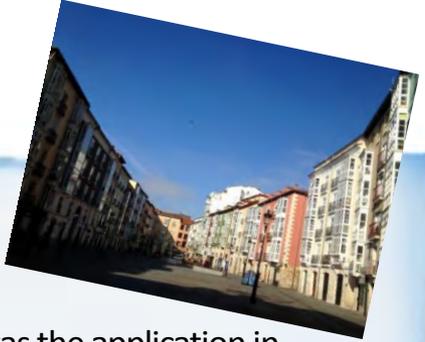
The short trip also included a stay at the Pontifical Catholic University in Rio de Janeiro. As part of the colloquium for professors, staff, and students of the “Departamento de Engenharia de Materiais (DE-Ma)” Timo Bernthaler presented his activities in Aalen. Then there was the opportunity to share experiences and technical discussion for possible collaborations for student exchange. The Faculty has excellent technical overlap – especially in microscopy, materials testing, and publications in the field of computed tomography and image analysis are already available. In the future, exchange opportunities for students in Brazil and vice-versa in Aalen may be created.

Through contact with Professor Sidnei Paciornik of the Pontifical Catholic University and the Sociedade Brasileira de Microscopia e Microanálise, joint activities in the fields of microscopy and materials testing are being undertaken with the Zeiss company. German-Brazilian cooperation was strengthened by joint publications on computed topography measurements. Professor Paciornik has already been to Aalen University in July 2013 as a guest at the first Aalen Material Microscopy Day. There he gave a lecture on the microscopic analysis of input and raw materials for steel production. ■ [bern](#)

Dear Limes Reader,

After four semesters of studying International Business, I was finally able to start my hotly anticipated practical semester in August 2013. A few months ago I came back, how quickly this great time has passed! I had decided to go to Spain, since the Spanish lectures at Aalen University have always been a joy to me, and the Spanish lifestyle (clichés!) appeared attractive. For six months I completed an internship in the Department of Controlling at Mercedes-Benz España in Vitoria-Gasteiz in the Basque country.

Here Mercedes-Benz produces their Vito vans (named after the city of Vitoria) and the new V-Class. I first made contact with the team leader of the department – officially I subsequently applied via the local personnel



management. Not only was the application in Spanish, but throughout the internship I spoke exclusively in Spanish with my colleagues and managers in Vitoria. “My” team, Vitoria Controlling, is responsible for the overhead cost controlling and evaluating instruments in the Vitoria plant.

There was nothing true about the clichés of “Tranquilo...” and “Mañana, mañana”, the team was always busy.

Nevertheless, it was a very pleasant working environment. My colleagues very kindly took me into the team, introduced me to the bosses and other employees and explained to me the team’s tasks, concepts, terminology, and IT. I was provided with my own



workplace with a computer for the six-month internship. My main tasks were: participation in the thematic planning, reporting, cost effective analysis and advice to departmental colleagues about the German language (communication with the German plants / corporate headquarters as well as some of the reports are partially in German). In addition, I worked on tasks such as profitability calculations, created or modified presentations.

My team leader also shared with me a larger project on which I worked for my six months in Vitoria: the creation of a template for a standardised report for the global production plants in Vitoria, Dusseldorf, Ludwigsfelde (near Berlin), and Buenos Aires, showing all the relevant figures for



the year, and the close of the month. Thus I was able to have international contact by e-mail or telephone with controllers in other factories and along the way, improve my Spanish and English language skills.

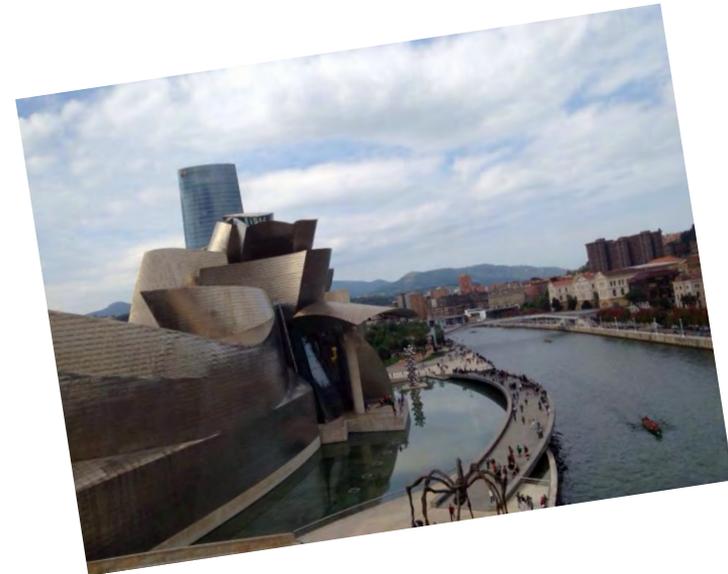
The contents of the internship and work in a large enterprise were super exciting. I generally had a high degree of personal responsibility. They confided in me a lot and had a lot of trust in me. I lived in an apartment with two Spaniards. My room was on the 5th floor of a city apartment between the attractive old town and my work. In my spare time, I did a lot with the other interns, trainees, and younger employees of Mercedes-Benz. Vitoria, with its popular bars, old

town, and mild climate, is a beautiful city with a high quality of life. There are many green spaces and parks – Vitoria was the European Green Capital in 2012. The city is located about 80km away from the Bay of Biscay, 25km from the Gorbea National Park, and approximately three and a half hours drive from the Pyrenees.

Visits to the beach, hiking, surfing, nightlife, and relaxing in the sun are all on offer. The Basque cuisine is characterized by dishes with fish fillets and seafood (all highly recommended) due to the nearby Atlantic coast. Nothing is noticed from Basque nationalists (if the groups even exist), and the security in the Basque country is excellent and the same as in Germany.

I have no regrets about coming to the Basque country. I would do it all again the same way.

*Sincerely,
Philipp Ottenstein
Degree Programme International Business*



limes international

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In the next issue:

Robotics,
ERASMUS Plus
and ...
much more!

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