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Insights from the experts at Steinbeis

Solar energy for schools in India
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HORIZON 2020
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Dear Readers,

Prof. Dr.-Ing. Lothar Issler is Head of the Steinbeis Transfer Center for Component Stability and Safety, Materials Technology and Assembly Technology (BWF) at Esslingen University of Applied Sciences.

In this edition of TRANSFER magazine, we embark on a series of presentations on different fields of technology. We start with two important and fascinating fields: materials and surface technology. Both are pivotal to industrial manufacturing and are tremendously important to modern-day R&D: around 70% of all technical innovations stem directly or indirectly from the availability of new materials; in the manufacturing sector, material costs account for over 50% of production.

Since the early days of human history, technological and social developments have been closely interwoven with the development and re-processing of new and expedient, high-quality materials, and the technical solutions that grew from this. Current material developments are driven on the one hand by the increasingly aggravated parameters of complex technical processes and the permanent introduction of new technology on the other.

Today's innovative material technologies are largely shaped by lightweight construction strategies derived from economic needs, but increasingly also from environmental requirements. Current material developments center mainly around ultra-high-strength steel, the more abundant use of non-ferrous metals, and the use of fiber-reinforced plastics, hybrid composites, intermetallic materials, nanomaterials, and natural organic materials. Increasingly, attention is also being given to intelligent materials. These can be used to switch and control processes by changing their properties. Such materials subsequently require development, testing and introduction to new manufacturing methods, presenting an alternative to welding.

Closely linked to modern material developments are a variety of extremely effective techniques used in surface engineering – technologies that can be used to adapt and optimize the specific properties of component surfaces. This is to improve safety, extend durability, improve mechanical protection (tribology), raise corrosion resistance, enhance workability and make optical improvements. This leads to new processes – to generate residual compressive stress in outer surfaces (e.g., shot peening), to harden surfaces (e.g., case hardening), to add wear-resistant layers (e.g., powder coating), for galvanic treatment (e.g., zinc coating), and for varnishing.

The Steinbeis Transfer Center Strength and Integrity of Structures, Material and Joining Technology (BWF), which is based at Esslingen University of Applied Sciences and runs a testing laboratory certified under Standard DIN EN ISO/IEC 17025:2005, has been looking closely at the properties and strength of materials since it was set up in 2002. The areas covered by the BWF span all methods relating to the integrity, reliability and availability of technical products. Its services range on one side on the determination component stresses and on the other side on investigating the resistance of technical components. This includes numerical and experimental stress analysis, identifying and evaluating material properties, the integral testing of components, subsequent safety testing, and finally investigating component failures. The main focus of the BWF is the reaction of components to cyclic operation stresses. Fatigue strength testing spans all important technical materials. BWF applies amongst others surface techniques to characterize the stress and state of surface-hardened and galvanized components, also checking the long-term operational reliability of surface-treated parts.

I do hope you enjoy reading this latest edition of TRANSFER magazine and that it provides you with plenty of pointers for your own area of work, especially in terms of advanced material and surface technology!

Yours

Prof. Dr.-Ing. Lothar Issler

Successful project: photovoltaic installation at the Sri Aurobindo International School

Solar energy for schools in India

A pilot project looks into the possibilities of decentralized energy production

With a population of nearly 7 million, Hyderabad is the sixth largest metropolis in India. Located in the southern Indian state of Andhra Pradesh, this city is seeing continual growth in its population, primarily accelerated by a booming economy and an influx of people migrating from the countryside. As a result of these changes, the city has witnessed a sharp rise in demand for commercial energy, and, indirectly, energy consumption. Since this demand is met through conventional energy production, per capita emissions of green house gases are on the rise. The "Solar Schools" pilot project is part of a German–Indian research project called "sustainable Hyderabad." It was established to foster the sustainable development of the future megacity: Three secondary schools took part in the pilot study and installed solar photovoltaic (PV) systems on their school rooftops. The Steinbeis Centre for Technology Transfer India carried out the project together with its project partners.

The rising demand for energy has led to frequent power outages in Hyderabad in recent years and these blackouts have significantly affected teaching conditions in schools, particularly since key electronic devices such as computers, fans, and lighting systems need power to run. Yet Hyderabad enjoys lots of sunshine – anywhere from 5 to 5.5 kWh per day – and that means gaps in energy production can be filled, in part, through alternative sources. The solar project aimed to demonstrate that it is technically and financially feasible to cover a part of the schools' energy needs through solar power production. It focused on four key targets:

- To bridge the gap between energy supply and demand in the schools
- To research the feasibility of installing small PV systems on school rooftops and develop a sustainable business plan for installation, which could be used as a blueprint for other buildings
- To contribute to administrative improvements and compile information for political debate on funding solar systems
- To raise awareness of environmentally friendly energy production

Improving on the current institutional situation, the Indian government has been supporting solar energy since 1992 through the Ministry of Alternative and Renewable Energy. It introduced the National Action Plan for Climate Change (NAPCC) in 2008, effecting a paradigm shift within the Indian climate protection initiative: Solar energy development was identified as a core national objective of the initiative. In 2009, the Jawaharlal Nehru National Solar Mission (JNNSM) proposed an ambitious target of achieving up to 20 GW of power through solar energy production by 2022. Various financing plans were established to reach this national directive, for both grid-dependent and independent solar energy plants. Smaller, grid-dependent solar energy plants would be funded at the state level through fixed tariffs laid down by energy regulatory bodies. However, institutional limitations have made it difficult to implement appropriate measures in most of the states across the country, and this also holds true for Andhra Pradesh. In addition, commercial awareness of renewable energy is still in its infancy in India, with most households unable to bear the high installation costs for such systems. The pilot project aimed to prove the feasibility of small PV installations in the city of Hyderabad in order to raise awareness.

The project kicked off with the development of a financial model. The model was established through several workshops and project planning meetings. It proposed that 30% of the costs would be subsidized by the state and the remaining 70% would be covered by the schools through charitable donations and corporate social responsibility contributions made by companies.

In terms of engineering, selecting the components was a key priority for the project. The usage rate or fill factor of a PV installation determines the quality of the system. The usage rate defines the performance of the overall system, defined as the ratio between the maximum attainable output and the actual open circuit voltage. The project team selected a PV module guaranteeing 25 years of operation and an efficiency of 80% under standard operating conditions. It also included an inverter and a battery storage system, each boasting a running efficiency of 85%. Together, the system includes a solar module, inverter, charge regulator, battery storage system, data storage, and peripheral accessories such as cables and mounting parts. The PV systems were installed at the three pilot schools by qualified systems engineers and electricians. Teachers and students were involved in the installation process to give them a better understanding of how PV systems work. The output of a system can easily be monitored in real time thanks to the integrated data storage and a dedicated online portal. This also means potential errors can be quickly identified.

The work in Hyderabad showed the project team the financial feasibility of small-scale photovoltaic installations and highlighted the challenges and opportunities that arise in emerging markets. The collective experience made in terms of financing, coordinating, and managing such compact, rooftop solar installations will prove useful in making knowledgeable decisions in other megacities. At present, financial assessments show a payback period of over eleven years for a 3 kW system. This speaks for great market growth potential despite the high initial installation cost. It also clearly shows that there is true market potential, even without funding from the state.

The experience made by the solar industry in Hyderabad underscores the typical teething problems that can arise in emerging markets with inexperienced decision-makers. Despite an impressive number of new suppliers on the market, only few were interested in the project – most project developers were involved in megawatt projects. Together with Granzör Engineerings Pvt. Ltd., a project developer from Delhi, the Steinbeis Centre for Technology Transfer India ultimately found experienced project consultants to carry out the project.

The schools in Hyderabad showed great willingness to switch to solar technology, primarily for two reasons: (1) In comparative terms, the high cost of generating emergency backup power with diesel generators nearly match the long-term costs of running the solar installation and (2) the payback period is very attractive. Over the course of the project, other schools in Hyderabad also showed an interest in using solar energy. The project team is convinced that small-scale, rooftop solar installations will begin to find broader application as the technical and financial feasibility of the pilot project becomes more well known. In addition, the government is now establishing a long-term framework for projects. The state of Andhra Pradesh has introduced a solar energy storage system for operators of installations to store excess energy. This initiative is a step in the direction of a feed-in tariff for solar energy in the near future. Plans to expand the project can be linked to state programs for rooftop solar installations to foster knowledge sharing and motivate more people to become involved.

The project team agreed that one particularly important aspect of the project was the awareness it has raised for renewable energy and sustainable choices made against the backdrop of climate change. The long-term running and maintenance of the solar installations by teachers and students fosters theoretical and practical understanding of this new technology. The results of the pilot project can be shared between schools through common activities and workshops. And research institutes and companies can tap into the PV data generated by the system. The pilot project also underscored the role played by public bodies in facilitating wider use of small solar installations. However, this would mean reviewing the existing political instruments and guidelines for the industry to promote more widespread acceptance in society. Current funding offered by the Indian government is not enough to ensure long-term growth in the sector, since the financial means are limited to an unknown number of projects and it is unclear what future funding systems might look like. For the sector to grow in the long term, well-organized initiatives are needed, taking project feasibility into account along with the financial burden on public funds due to higher solar tariffs.

This case study has shown that small-scale solar installations can make a substantial contribution to clean energy production in cities – only, however, if certain conditions are met: Solar energy is only an option in countries with plenty of sun. Furthermore, business and cultural factors will determine the extent to which renewable energy can be used.

Steinbeis Centre for Technology Transfer India

Portfolio of services

- Technical consulting
- Technology scouting
- Technology evaluation
- R&D
- Technical training
- Further education
- Expansion of the Steinbeis Network in India

Key areas

- Mobility (automotive and aerospace technologies)
- Manufacturing technologies (machine tools and automation, etc.)
- Renewable energy technologies (solar PV, CSP, geothermal, etc.)

Vineet Kumar Goyal, Phungmayo Horam, Angela Jain, Christine Werthmann

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The panel discussion on the challenges of international talent recruitment: Senator E. h. Wolfgang Wolf, Prof. Dr. Dr. h. c. Harald Unkelbach, Prof. Dr. Helmut Haussmann, Jürgen Oswald, and Rainer Heck (left to right)

Globalization.Competence.Business.

Review: The 2013 Seinbeis Competence Day

As globalization increasingly reaches out into politics, society, and business, companies find themselves operating in a world overbrimming with business opportunities. International competence has developed into a decisive factor for long-term success both personally and professionally. In December 2013, the 6th Steinbeis Competence Day looked at the ways companies and universities are addressing this key success factor. Around 300 delegates responded to the Steinbeis Foundation invitation to the event held in Stuttgart's Haus der Wirtschaft.

In the opening speech given by Prof. Dr. Werner Faix (School of International Business and Entrepreneurship [SIBE] at Steinbeis University Berlin [SHB]), a look was taken at the overarching topic of skills and competence within the complex area of globalization. This also addressed the general issue of identifying the competences companies need in a global economy and how these might be developed.

Once this foundation was laid, Prof. Dr. Helmut Haussmann (Steinbeis Transfer Institute Institute of Management and Internationalization at SHB) opened and moderated a panel discussion on the topic of "Globalization.Competence.Business", with a particular emphasis on medium-sized enterprises. Senator E. h. Wolfgang Wolf (LVI, the Baden-Wuerttemberg State Association of Industry), Jürgen Oswald (bw-i, the Baden-Württemberg International Association of International Business and Scientific Collaboration), Prof. Dr. Dr. h. c. Harald Unkelbach (Adolf Würth GmbH & Co. KG), and Rainer Heck (SIBE) underscored the special role played by networks in building international competence. Drawing on their personal experience, they pointed to the fact that innovation is not just about technocratic factors, but also emotions, character, and cultural issues.

The speech given by Prof. Dr. Dres. h.c. Rainer Arnold (University of Regensburg) looked at modern legal experts, who – as a result of a global, transnational world – are no longer domestic but also international experts, pointing to the need to reflect this in training.

Paulo Mól (Instituto Euvaldo Lodi [IEL] at the Brazilian confederation of trade and industry Confederação Nacional da Indústria [CNI]) and Peter M. Dostler (GD Consult, Brazilia) gave a speech on the Brazilian experience with the recruitment of up-and-coming managers and skills development. Umesh Kaul (IBM India) looked at ways that competences could be developed for international business, drawing on the example of IBM India. Yan Janet Qin (Elite Talent and Technology Consulting Co., Ltd) gave an insight into the recruitment of young managers and skills training in China.

Videos of selected speeches and a photojournal of the day are available in German at www.steinbeis-competence-tag.de. The next Steinbeis Competence Day takes place on December 3, 2014.

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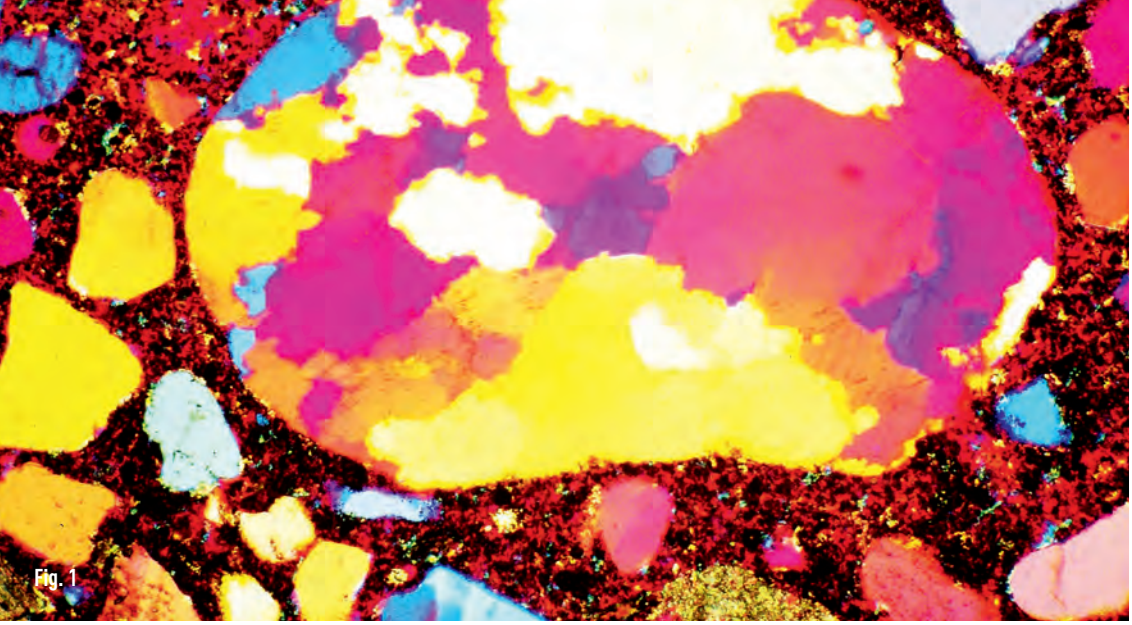
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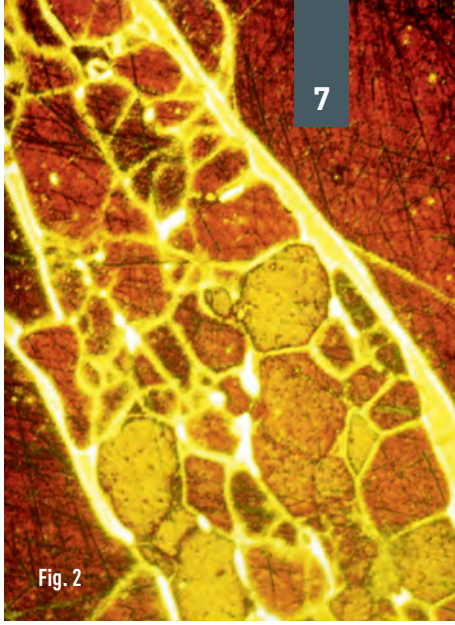
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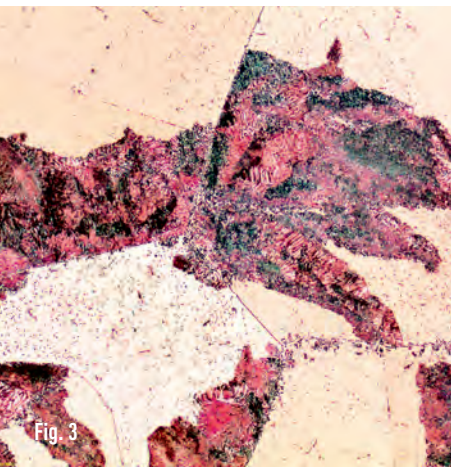
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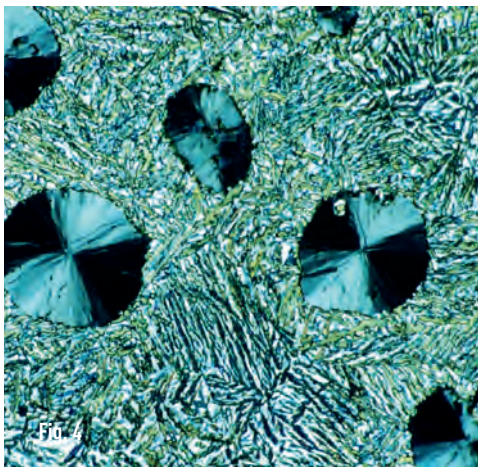
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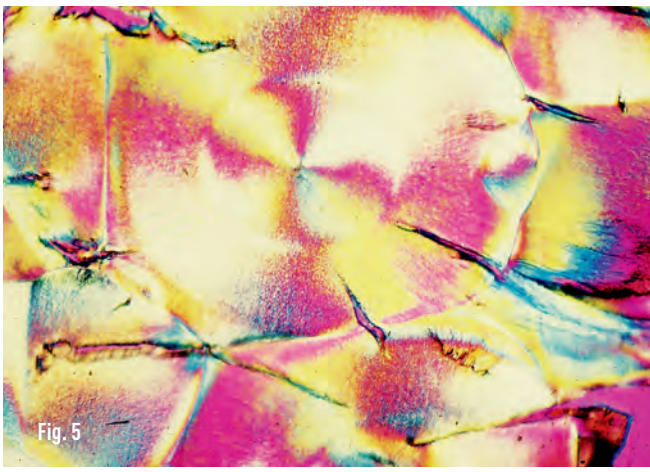
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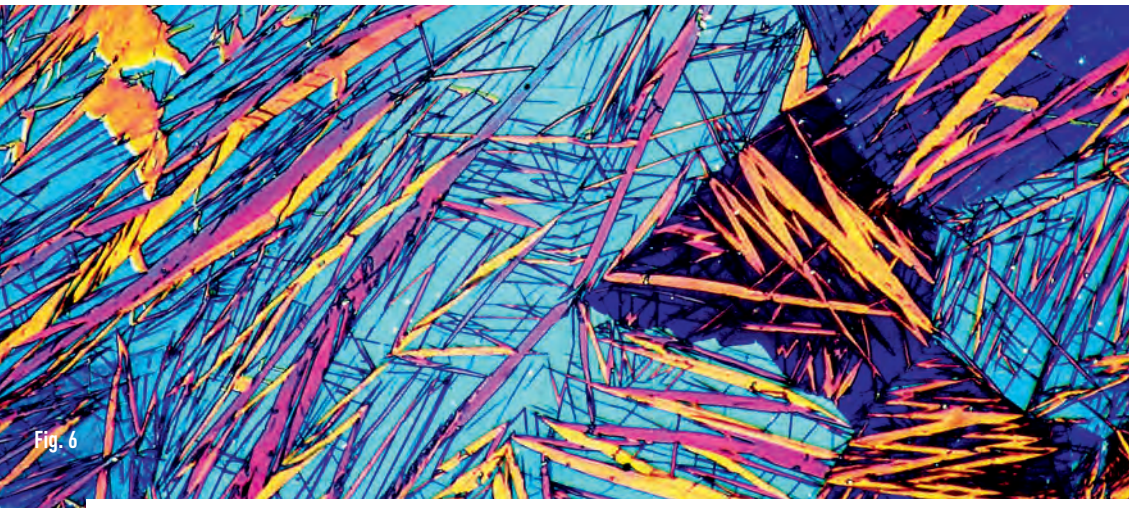
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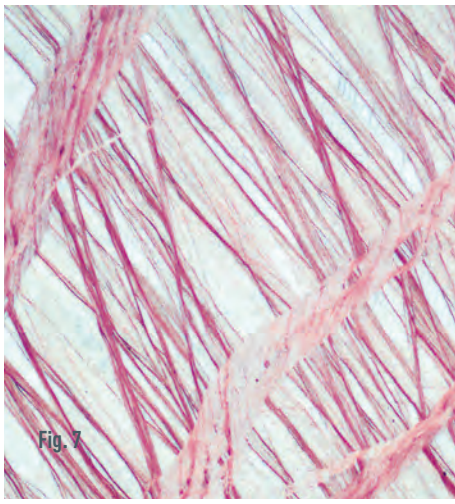


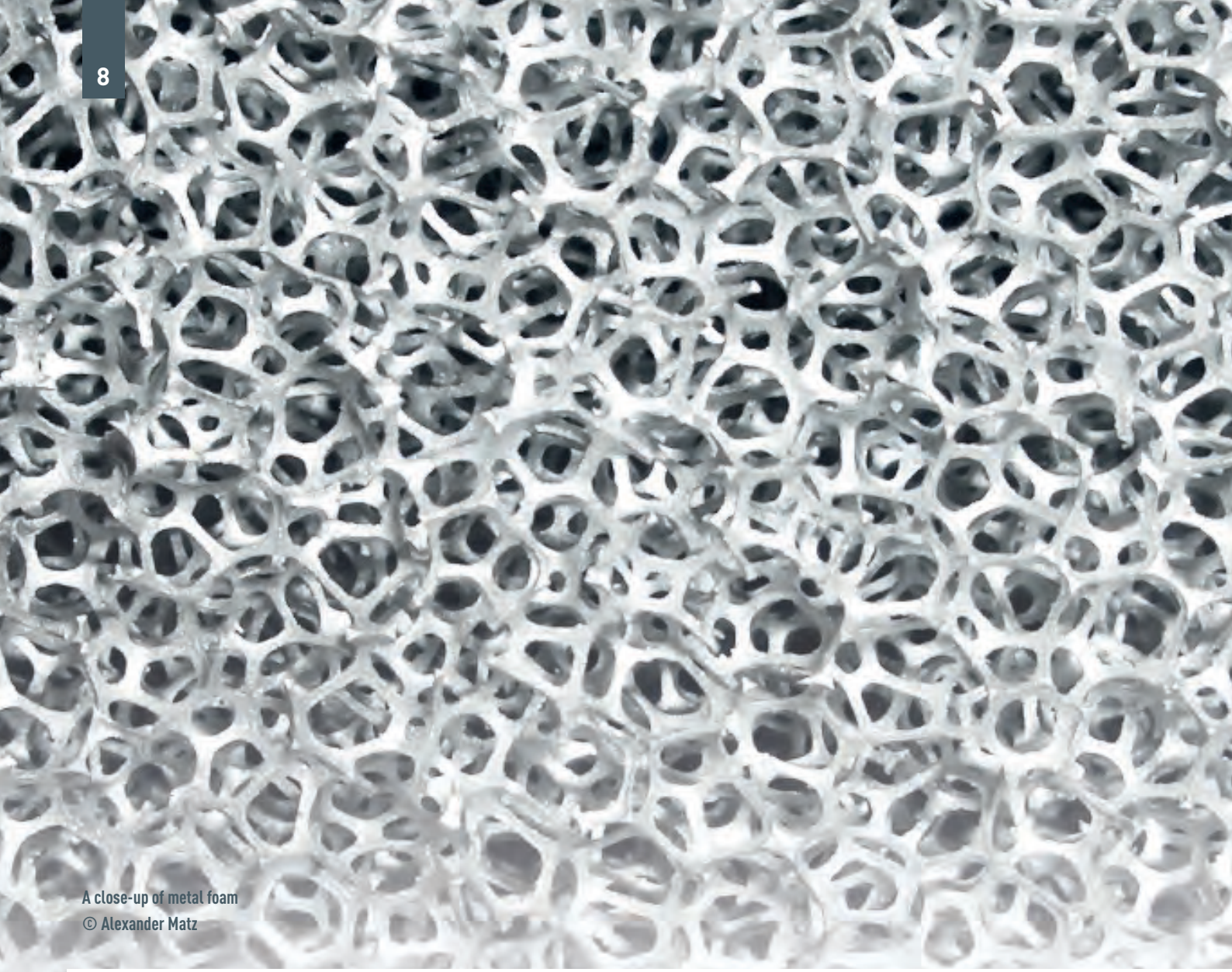
Fig. 7

Feature topic: Material and surface technology

Insights from the experts at Steinbeis

Material and surface technology plays a central role in the manufacturing industry and is thus pivotal to delivering innovations. This edition of TRANSFER looks at the important role played by this field of technology from a variety of angles. On the pages that follow, a number of Steinbeis experts write about the technologies they devote so much of their time to: Dr. Alwin Nagel heads up the company Matworks and researches, develops and advises in the field of materials; Prof. Dr. August Burr heads up the Steinbeis Transfer Center for Plastics, which specializes in materials and testing, especially injection molding processes; Prof. Dr.–Ing. Norbert Jost, who heads up the Steinbeis Transfer Center for Raw Materials Development and Testing, explains his view on the status of material and surface technology developments; Prof. Dr. Britta Nestler and Michael Selzer conclude with their Pace3D project, looking at the future of technological developments.

Fig. 1: Concrete from the former Berlin Wall | Fig. 2: The Fe-Ni structure of the Toluca meteorite| Fig. 3: A Cu-Mg alloy extract | Fig. 4: A cast-iron alloy with globular graphite | Fig. 5: Teflon (polytetrafluorethylen) | Fig. 6: An Fe-Ni-Co-Ti shape-memory alloy | Fig. 7: A Cu-Mg alloy after remolding. Figs. 1, 2, 4, 5, 6: © Prof. Dr.-Ing. Norbert Jost, Fig. 3: © Dr.-Ing. Andreas Zilly, Fig. 7: © Simon Kött



A close-up of metal foam
© Alexander Matz

The key to technological progress: materials

A frequently overlooked driver of innovation

There is general consensus these days that our fundamental needs as human beings go beyond food and energy, and increasingly include raw materials –especially the kinds of materials that are extracted or produced from raw materials. It is materials that make it possible to translate concepts into technical realities and achieve certain functions. How materials provided the actual key to the development of a technology in the first place is the topic looked at by Prof. Dr.-Ing. Norbert Jost, director of the Steinbeis Transfer Center for Material Development and Testing (WEP) at Pforzheim University.

There are many examples of such developments, which can only be covered briefly here and are thus consciously summarized in this list (in chronological order): hardenable aluminum alloys; fiber-reinforced composites; metal carbides; high-temperature polymers; metallic glasses; shape-memory alloys; fiber glass used to transmit information; micro-alloyed, fine-grained structural steels; ultra-high strength materials (based on polymers, ceramics, and metals); materials offering high-temperature superconductivity; implant materials; ultra-light metals etc. Under closer examination, two out of every three technical innovations actually boil down to material developments. As well as materials developed totally from scratch, these naturally include re-developments or optimizations of known materials. Even if all fields of technology and industries need material innovations, unfortunately these often receive nothing like the degree of public recognition they deserve.

Nonetheless, the German government and a variety of funding partners have also recognized the potential in this area and are paving the way for this field to move forward with a "high-tech strategy" – most recently thanks to a multitude of so-called innovation alliances.

An important defining feature of modern technology is that smaller and smaller quantities of materials are required to perform certain tasks or functions. Not only does this result in more compact and lighter products – that still perform excellently – but it is increasingly shifting the focus toward sustainable savings in raw materials and energy. This is undoubtedly and clearly a sign of technological progress, due largely to new or improved materials or production methods.

In many ways, materials are linked to humanity's fundamental need for energy. To produce these materials, energy is needed, sometimes lots of

it – as is the case with aluminum, magnesium, and titanium. The availability of materials to go into a technology – which should continue to do what it can to support society in the future – is therefore closely linked to the availability of energy. Yet things are very positive on the credit side of the material-to-energy ratio, since, of course, it is again materials that play such a central role in dictating the viability of producing and transporting energy. Also, when it comes to safety – with things like machines, airplanes, vehicles, ships, bridges, and buildings – the choice of the material is crucial, especially in terms of quality and processing. That said, one area where some development and catching up may be necessary is with the basics and techniques of recovering raw materials from used materials. Here it is worth highlighting some new-generation material such as modern fiber composites, materials used in lithium-ion batteries, and several others. The techniques used until now to recycle working materials and raw materials are still not satisfactory enough or right for the long term.

Looking at this entire issue from a scientific angle, it is worth noting that since around the 1960s, material science and its sub-disciplines have developed at a tremendous rate and have penetrated to a substantial scientific depth as a stand-alone specialist field. Now a fundamental science that underpins many other technical disciplines, particular attention is given to the relationship between microscopic composition and the nature of materials. Materials science is particularly important for explaining universally valid principles of the extremely broad field of materials engineering, which is also undergoing rapid development. Not only are new materials being developed, ideal materials are being identified for specific purposes. Materials science taps into a large number of sub-disciplines within other sciences (physics, chemistry, mechanics, thermodynamics etc.). So to allow materials science to become a "supporting science," a separate, underlying basis had to be identified and this came most obviously from the very microstructures of materials, i.e., their composition. The question thus posed was how atoms or molecules could be pieced together to create a solid material as required – and, based on this, how these microstructures could be positioned, due to their properties, as required, for a specific application.

It has become standard practice to make a distinction between structural and functional materials. For example, with some materials, the task is to structure things and put them together into the right composition. The focus lies in the mechanical properties of a material. This basically comes under the general header of mechanical strength. So materials have to be strong and capable of withstanding stress, safely, over time, in a variety of environments (temperatures, corrosive surroundings etc.). Functional materials have a different role to play. Here the focus lies in the totally different physical properties of a material (such as the data density offered by storage media, resistance to radiation, shape memory). Materials science has now become so well established that new specialist fields have broken off and developed into separate areas, such as nanotechnology or fracture mechanics.

Almost by default, materials science can only be fully understood and investigated by underpinning and corroborating scientific principles with the right testing and experimentation. Of the many physical, chemical, and technical testing methods used, optical approaches relating to light and electron microscopy play a central role here. Ultimately, these make it possible to systematically and comprehensively depict the aforementioned material compositions.

Sourcing, processing, and forming materials into components and machines enjoy a long and scientifically well-founded tradition, especially in Germany. Without a doubt, this has involved surviving some major economic crises. But this has not damaged materials know-how, neither in the labs and institutes of different areas of higher education, nor in the many development centers specially set up by companies. On the contrary, in some areas, activities actually became more concentrated and the discipline received a strong boost. The many Steinbeis Centers with a focus on materials were not unaffected bystanders during this process. Their services enjoy increasing demand from industry – from support with the development of new materials and material concepts, to investigating and assessing damage after a material was used incorrectly or badly produced. One such center is the Steinbeis Transfer Center for Material Development and Testing. Affiliated with Pforzheim University, after over a decade, the center is an established and trusted partner to local industry, with close-knit and lasting networks spanning many companies. The transfer center's work revolves around three key areas: i) materials development and optimization ii) the validation, testing, and analysis of metallic materials, and iii) the optimization of materials-related production processes.

Prof. Dr.-Ing. Norbert Jost and Prof. Dr.-Ing. Gerhard Frey are joint directors of the Steinbeis Transfer Center for Material Development and Testing (WEP) at Pforzheim University. As well as investigating, testing, analyzing, and developing materials, the center specializes in damage assessment.

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"Research into materials and surfaces is a core building block in safeguarding Germany's role as an industrial nation"

An interview for TRANSFER magazine with Professor Dr.-Ing. August Burr

Professor Burr, research into innovative surface technology is gaining more and more attention as a means of competitive differentiation and safeguarding industrial locations – not just within companies but also within politics. What do you believe is the reason for this trend?

Surface engineering is a key area of technology. Without resistant surfaces things like mobile aerials wouldn't survive the weather very long, cellphone screens would fade – without biocompatible surfaces, implants would be rejected immediately. From a societal point of view, we need surface engineering to solve global issues in a variety of areas, such as climate and energy, transportation, food, environmental protection, and health care. These are the markets of the future and surface technology will play a role in opening up these markets. Research into materials and surfaces is a core building block in safeguarding Germany's role as an industrial nation. The Steinbeis Transfer Center Plastics Center is also making important contributions to surface engineering. Politicians expect the necessary funding for this to be made available by the German Ministry of Research.

The work of your Steinbeis Transfer Center revolves around your interest in plastics. One key area of this is injection molding technology, which is tremendously important when it comes to production in mass markets. What challenges does this technology face at the moment? Is there a trend toward Germany returning to more plastics production in the future?

Injecting molding has been an established part of the profitable production technology used for molded plastic parts for a long time, especially for high-volume parts. Aside from extrusion, it's the most important processing technique. The biggest challenge lies in the commercial pressure to continually raise automation levels at the maximum possible energy efficiency. In recent years, there's been a rapid rise in the number of complex applications that require different functions – from the same molded part, in specific combinations – so over the last decade a large number of special injection molding processes have been developed, involving technically intricate machines and tools. These developments serve to strengthen Germany as a producer. But I've not observed any significant trends back toward more standard injection molding production in Germany.

There's a small revolution going on in production technology, with the development of so-called 3D printers – at least there is in the production

of prototypes. Will this innovation have a decisive impact on injection molding?

In terms of prototype construction and plastic products in small batches, there are huge expectations in the plastics industry that 3D printing technology or a similar process will provide a commercially viable alternative relatively soon. Breakthroughs already appear to have been made with the quick manufacture of first-stage plastic parts and components, based on initial designs. But whether these parts will ultimately be good enough to fulfill quality expectations can't yet be answered with a "yes," and, in the future, this will remain a fascinating area for research and development.

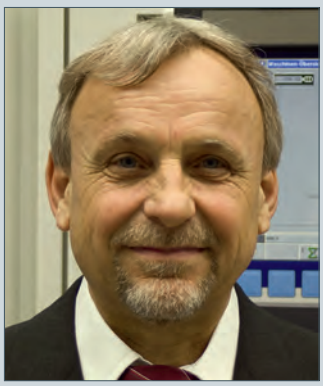
Turning to lightweight construction, which is growing in importance, a key role here is played by glass-fiber and carbon-fiber reinforced plastics (GFRPs and CFRPs). Until now, production has still been a largely manual process. How much potential is there to automate these processes?

As in the past, the trend is still to use fiber-reinforced components even in mass production, especially in the automotive industry (CFRP). This is mainly because, ignoring the argument about the lightweight construction, compared to existing technology, these parts make it possible to integrate a relatively high number of different functions and they leave a lot more leeway for different design options. In terms of recycling, this trend could be viewed more critically, however. But there is still a long way to go in terms of exploiting the full potential to automate processes. We're currently working on a research project at the University of Heilbronn to halve the curing time of matrix resins used in CFRP car bodywork components by using a special dynamic temperature channeling technique on RTM pressing tools. This should also improve component quality. Downstream processes can also be optimized by using modern laser technology. Also, the level of automation can be raised by using machines like robots to lay sheets into the molds.

The future of surface technology will be strongly dictated by economic and social trends. For example, new processes in this area could enhance energy efficiency or lead to innovative medical equipment or sustainable transportation. What do you believe the future holds for the industry and what topics will shape the next few decades?

In the foreseeable future, markets shaped by the trend toward sustainability will experience significant growth. A number of recent studies underscore this. Technologies named in this context include powerful energy storage solutions, decentralized power generation, the use of renewables, new mobility concepts, personalized health care, and infrastructure matched to the needs of the elderly. Surface technology plays an important role in most of these "sustainable markets of the future." Depending on the area, certain properties are needed – surfaces that are extremely smooth, or rough, adhesive, hydrophobic, hydrophilic, bactericidal, biocompatible, rigid or flexible.

The following examples highlight the importance of surface technology. Durable, corrosion-, friction-, and UV-resistant surfaces are now indispensible in solar panel equipment and reflectors used in large solar heating systems. Special coatings used in vehicle powertrains significantly reduce energy losses by minimizing friction. Special structures added to the surfaces of rotary blades on wind farm equipment and the outside of aircraft ultimately help reduce aerodynamic losses. By adding minute functional surface structures at the nanometer level to plastic parts, it is possible to make antireflective glass, antireflective layers on solar energy modules and monitors, or hydrophobic and hydrophilic surfaces. Tribological, haptic, and biocompatible properties can be influenced by specifically structuring micro- and nano-engineered surfaces. Recent processing techniques, such as a highly dynamic variotherm injection molding technology developed at our Steinbeis Transfer Center, now make it possible to produce precision parts economically out of thermoplastics and include these kinds of functional surfaces in mass products. This is leading to new products with specific functional properties – of major interest to all sectors of industry!



Prof. Dr. August Burr heads up the Steinbeis Transfer Center Plastics Center at the University of Heilbronn. Professor Burr and his team work on surface technology, the design of molded parts and tools, injection molding technology, and materials and damage analysis.

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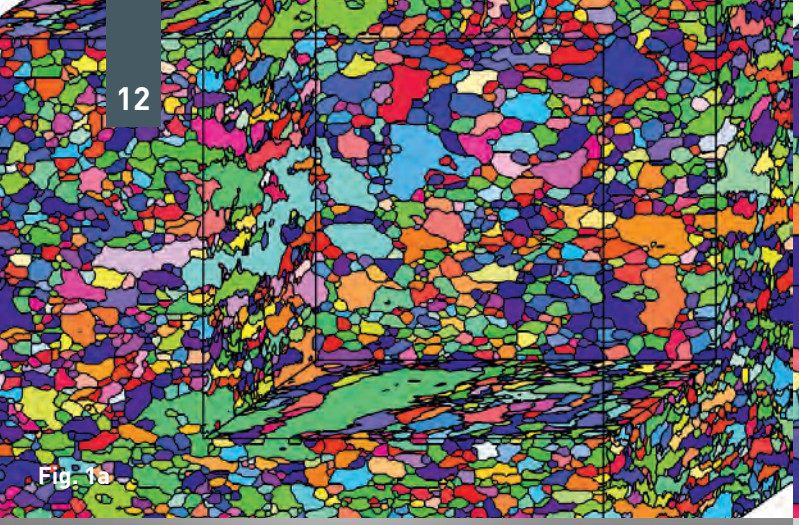


Fig. 1a

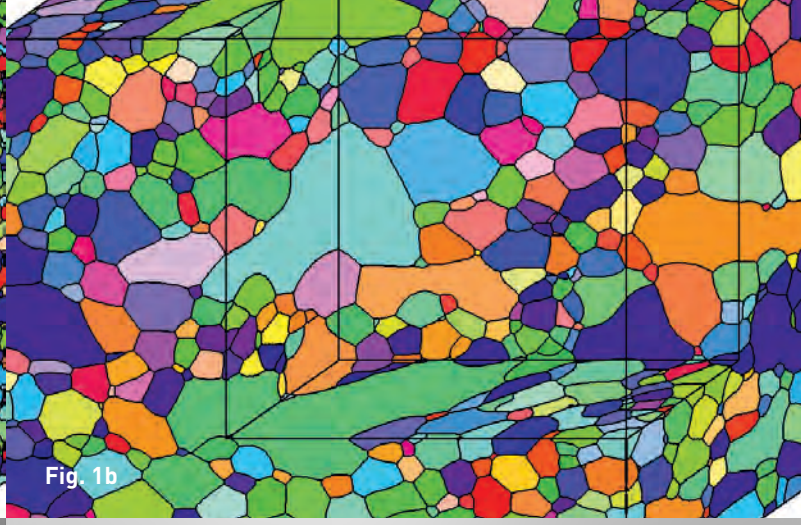


Fig. 1b

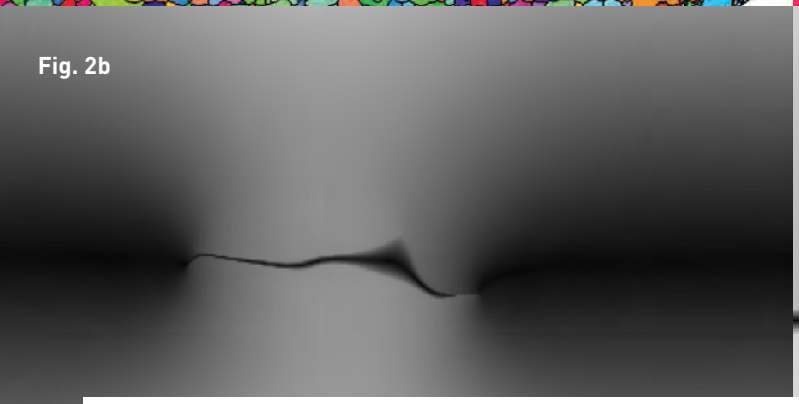


Fig. 2b

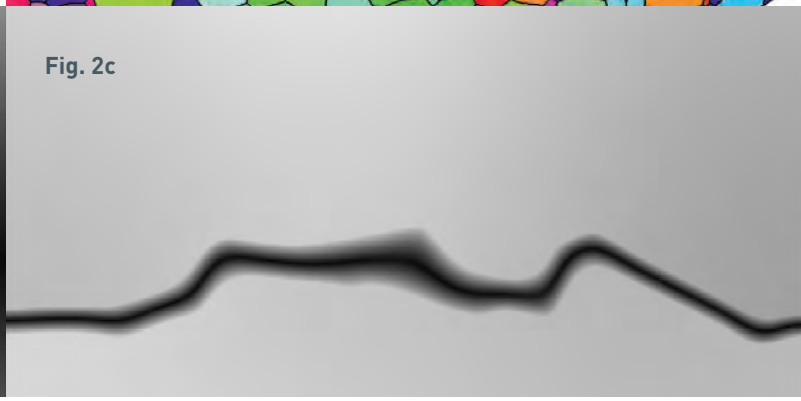


Fig. 2c

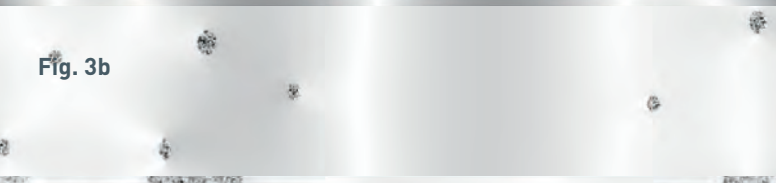
New materials developed with time and resources in mind

Pace3D is a simulation software package supporting the development of materials

The process used to produce components influences the microstructure of almost all materials – and thus has an impact on mechanical properties. Process conditions and material parameters affect the phase transitions and growth morphology of microstructures. The characteristic composition of resulting microstructures has a crucial influence on the quality of a material. Pace3D is a software package developed at the Steinbeis Transfer Center for Material Simulation and Process Optimization, which is based at Karlsruhe University of Applied Sciences. The software is a reflection of current material technology trends: It provides the means not only to save time and resources in the development of materials, but also to systematically investigate correlations between different compositions and properties, to predict durability, and to run checks on components.

Modern simulation processes, such as the technique used by Pace3D, make it possible not only to gain insights – in situ – into the final composition of a material, but also to examine the structure-forming process in 3D. It is frequently possible to change the quality of materials and processes by making small adjustments in the processing technique or by varying the composition. Pace3D simulates material microstructures, making it possible to determine in detail how materials react to external influences such as heat, magnetic fields, mechanical strain, or fluid-mechanical influences. In many production processes, the polycrystalline structure of grains and the distribution of grains of different sizes is pivotal to the hardness and breaking strength of a material. In use, materials are often subject to thermo-mechanical strain which systematically changes the structure and eventually wears down the component part. By delicately managing the process, the composition of the structure and subsequent changes in the microstructure can be carefully influenced and this software can be used to design a material and arrive at specific properties. Instead of experimenting and using metallographic and mechanical characterization, which typically damages the sample, calculations can be used. The material, the component and the future process can be planned on the computer using material simulation processes – thus conserving resources and saving energy. This reduces expensive testing and weak points can be avoided during the design stage on the computer. Pace3D supports this modern material development process and by focusing on the simulation of the composition of microstructures, it has become a core component of integrated computational materials engineering (ICME), an internationally recognized technology of the future. ICME is a new, shooting-star field of materials research. The vision is of a holistic system, centering on computation-based product and materials development and integrating scale-independent simulation methods of materials science.

These new microstructure simulation solutions, provided by Pace3D, analyze the impact of extreme strain on material properties. Computations make it possible to examine factors such as grain coarsening as a result of heat treatment (Fig. 1) or the formation of fissures under continuous or cyclical stress caused by external influences. The simulation in Fig. 2 shows a material sample under permanent tensile stress along the vertical axis. A fissure forms, usually along the grain boundaries. Another example of examining mechanical strain in applications involves material failure and analyzing strength or hardness. This involves experimenting with different nominal loadings and stress durations. In the microstructure simulations shown in Fig. 3, the actual timing of material failure can be ascertained with concentrated particle distributions under cyclical stress. The results can be plotted as a typical Wöhler curve and predictions can be made about the structural strength of different microstructure samples. By planning precise processes, the



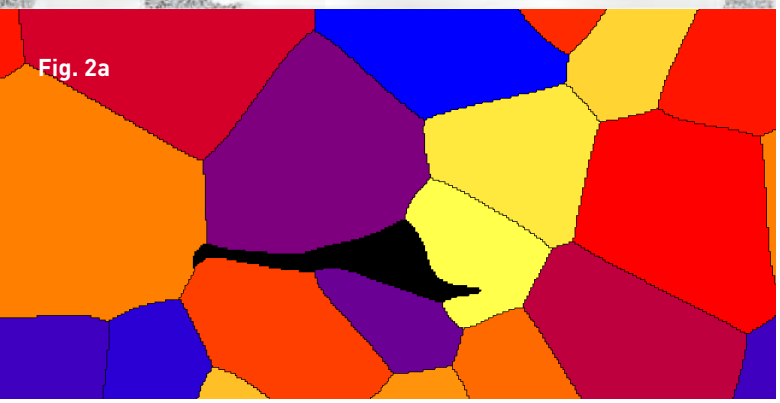


Fig. 1a, Fig. 1b: Two snapshots of a simulation of grain coarsening in a polycrystalline material with orientation-dependent grain boundary energy. Fig. 2: Mechanical strain in a grain structure under tensile stress, applied vertically at the lower and upper domain boundary: a) Image of a fissure in the grain structure developing over time (black areas), b) Stress distribution in the microstructure. Fig. 3a, b, c: A tensile experiment on a homogeneous material with distributed particles: cyclical stress was applied at the left and right domain boundary. The material strength was evaluated at the time of failure for different nominal stress amplitudes.

The Pace3D simulation software contains several components.

- **Pre-processing:** user-friendly preparation of material parameters through interfaces with thermodynamic databases; configuration of the simulation unit by converting experimental measurement data or microstructure images; comprehensive algorithms for filling areas.
- **Main processing:** simulation protocols for the numerical solving of different material models including parallel and adaptive algorithms for optimizing storage requirements and calculation times; interfaces for automating parameter studies.
- **Post-processing:** comprehensive collections of software tools for evaluation and graphically representing simulation data.

formation of microstructures can be carefully controlled and software can be used to develop materials with specific properties.

Pace3D is a comprehensive software package for large-scale parallel 3D simulation on supercomputers. It offers an integrated data analysis module and high-quality images of the microstructure formation processes in metal alloys and other materials such as ceramics, polymers, and biological or geological systems. The package also includes tools for calculating phase transition processes in heterogeneous multiphase material systems, taking into consideration factors such as anisotropic properties, mass and heat diffusion, convection, elasticity, and plasticity. As well as providing a solver for determining thermo- and chemo-mechanical stress distribution, the software has modules for calculating multiphase flows based on Navier-Stokes equations or Lattice Boltzmann methods (LBMs). The flow solver makes it possible to simulate combined flow and heat transfer in porous materials, simultaneously taking phase transitions into account. Alternatively, flowing phase mixtures consisting of several liquid and solid phases can be calculated. In actual applications, it is possible to examine liquid propagation in channel structures and wetting behavior on topological or chemically structured surfaces. The computations allow to derive conclusions on reductions in susceptibility to corrosion. If fine-tuned to the specific requirements of the process being observed, different modules can be combined and used to describe different phase conditions, particle systems, and flow processes. Also, mechanical loads and tensile stress can be remedied.

Pace3D is programmed using C/C++ under Linux. Simulations can be conducted sequentially or in parallel on supercomputers using an MPI library. The software is broken down into modules to make it possible to adapt the configuration of simulation calculations to the special requirements of material systems and processes. It is also possible to combine individual modules for specific applications such as multiphase materials, diffusion, mechanics, and flows.

Prof. Dr. Britta Nestler and Michael Selzer are joint-directors of the Steinbeis Transfer Center for Material Simulation and Process Optimization at Karlsruhe University of Applied Sciences. The center's portfolio of services ranges from the development of models and software solutions, to the running of simulation studies for analyzing materials and processes, and for predicting external influences on changes in microstructures with the aim of optimizing process design and virtual reality-based material design.

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"New, outstanding materials are the most sustainable innovations"

TRANSFER magazine talks to Dr. Alwin Nagel

Dr. Nagel, you've been working permanently in the field of materials engineering since your studies in metallurgy. What made you decide to focus on this field and what do you find so fascinating about the topic?

Materials engineering and materials science are an interdisciplinary blend between engineering know-how and the sciences of physics and chemistry. It was this that led me to a degree in metallurgy and I still find it hugely appealing today. I enjoy looking into a material or component and examining its weaknesses – at the moment, for example, we're using "correlative microscopy" based on computer tomography, light and electron microscopy. We're tapping into our specialist knowledge of "quantitative microstructure analysis" and software engineering to measure microstructures and components intelligently and gain insights into them. We're using powder technology, sintering, and metal die casting to develop new materials with improved properties that are matched to applications. This engineering angle on science and technology means always being open to new ideas, being inquisitive, posing questions, and finding solutions. As Mr. Spock from Star Trek would say, I still find this "fascinating."

Although materials technology is practically invisible to the layman's eye, it makes a decisive contribution to socially important challenges in many future fields. In your opinion, when people are looking for new materials, how much consideration should already be given to its actual application within a product?

I started asking myself that question when I was a PhD student at the Max Planck Institute for Metal Research, and later as a researcher in industry – and I still think about it today. Practical application should at least be part of the vision at the beginning of any quest for new materials. This even applies to questions in fundamental research. So as a consequence, effectively all materials scientists are engaged in applied research. By that I mean the practical benefit of knowledge.

That being said, in practice I've rarely witnessed the original application idea actually unveiling the future market for a new material. Most material innovations simply take too long. The market's too fast and people find alternative materials – although new, outstanding materials always find a use. This means that they are the slowest, but also the most sustainable innovations. It's no coincidence that human history is described by the materials we used: the Stone, Bronze, and Iron Ages. Maybe today's the Silicon Age.

For a long time, materials engineering focused almost exclusively on metals. These days, thanks to a variety of developments in this area, we have access to a huge and expanding number of materials. Which developments do you consider the most important milestones in the history of materials engineering?

In modern times, semiconductors have to be the biggest milestone. Not only did they make electronics and IT possible, as we're seeing at the moment we now have environmentally friendly power generation with solar energy. There are functional materials for electrical conductors, contacts, even superconductors – all a leap forward. Innovative magnetic materials such as soft magnets and rare earth magnets have now made it possible to use electrical energy in generators and electric motors. In electronics, dielectrics and insulators have led to polymers that are changing the world. New high-performance polymers, especially composites with carbon fibers will be tremendously important in the future. They'll compete with established light-construction metals, the kind you find in aeronautical construction and vehicles.

You've been director of the Steinbeis Transfer Center for Materials Engineering for 12 years, and, since August 2013, you've been managing director of the company Matworks, which is also part of the Steinbeis Network. Your Steinbeis enterprises offer client services in the fields of materials analysis, composites, and functional materials. There's a strong emphasis on holistic solutions. How do customers benefit from this holistic approach?

Our clients come from a very broad range of areas, from small business with an acute need for a fast-turnaround damage analysis, to corporations with development projects lasting several years. We offer literature studies, patent research, and feasibility studies. All services require totally different know-how. For example, we also offer materialographic studies, magnetic measurement technology, and materials synthesis projects. Together, our aim is to identify holistic solutions which are matched specifically to the customer or problem. Clients value this and often recommend us to other departments. Long-term customer satisfaction is an integral part of our approach to customer acquisition.

Very often, we go step by step. So the focus may lie in efficiency, prospective success and risk. Together with our customers, we analyze their goals, derive appropriate measures from these, recommend efficient methods and draw up project options. During the implementation phases, we don't get bogged down in the data – we pull together all the findings and mix it with our scientific expertise to gain new insights as a team. With some of our core clients, we've earned our laurels as an efficient service provider to work on specific measurement projects; if they want to, the clients can then pull the results of the analysis together themselves. The key difference compared to in-house testing labs is the greater flexibility and quicker turnarounds. Of course high standards are a priority for us, and our labs have ISO-9001 certification. Also the best possible cost-efficiency is a given.

Turning to the latest material trends, there's a lot of talk at the moment about smart materials and new materials based on nano-technology and micro-technology. Where do you think future developments will take the industry? What new challenges will this present for projects at your Steinbeis enterprises?

Material innovations are typically targeted at new markets and promising applications. The focus currently lies in the sectors working in resource and energy efficiency, as well as electro-mobility. We're involved in a close collaboration with the Institute of Materials Research at Aalen University. It has a strong foundation in research and together we're shaping the future along the classic lines of Steinbeis technology transfer. We're developing smart materials in the form of new functional materials – for example, hard and soft magnetic materials, metallic-ceramic composites, and battery storage materials. In the area of the big megatrend at the moment – lightweight construction – we're currently focusing on the characterization of carbon fiber composites and their machinability. Then, hybrid lightweight construction will become important – i.e., combining CFCs with light metals, and joining technology. In terms of applied research and technology transfer, new material analysis methods are important. These have to go right down to the nano-level, in high resolution, offering total precision – but they also have to be quick. This is important so they can be used efficiently in industrial applications. The fact that there are opportunities to use new technology to leverage benefit on a broader scale in this niche area is being underscored by our partners in industry. As long as you use the right "tools," we're convinced that we're ideally geared to future trends, even the emerging ones that can't be predicted yet.

Dr. Alwin Nagel is Managing Director of Matworks, an enterprise in the Steinbeis Network. Matworks carries out applied research and works on customer development projects involving materials applications and properties.

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The Steinbeis Company Competence Check © Steinbeis

How competent is your company?

A Steinbeis tool for checking company competence

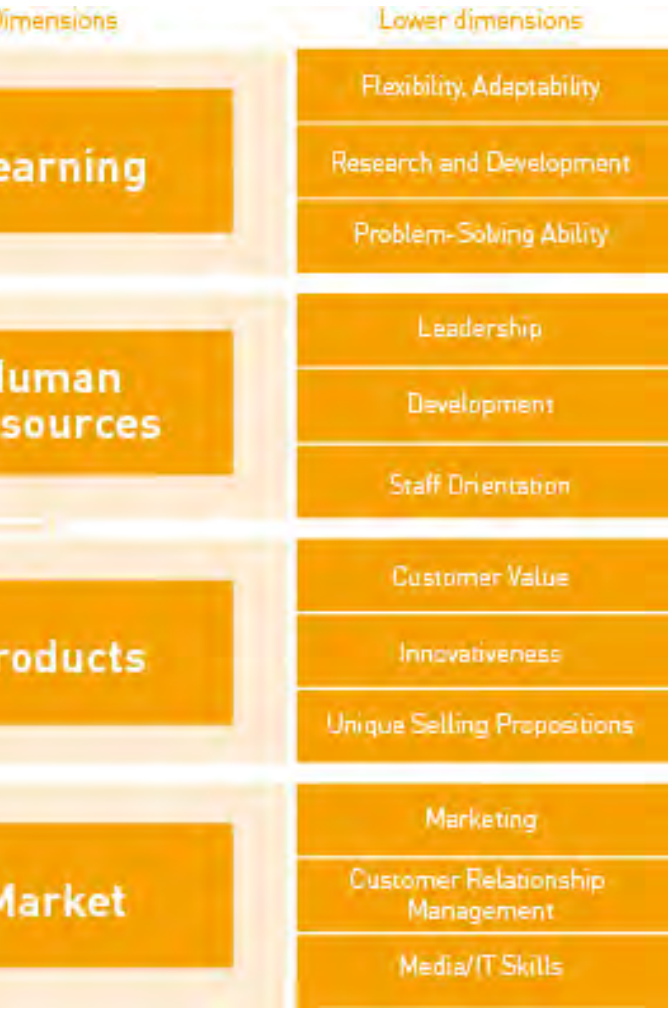
Company competence is increasingly being seen as the key to competiveness and business success. But how does one measure competence? There are already many concepts and instruments, but until now there have been no standards in terms of consistent content and methodology. The focus generally lies on HR issues, making it difficult to conduct an encompassing analysis of business competence. Not least, the tools available to date are not really user-friendly. This is where Steinbeis intends to make things easier: Experts in the Steinbeis consulting department are developing an instrument to check company competence that is comprehensive, easy to use, and draws on founded methods.

The tool will allow consultants to map standardized profiles of their clients' company competence, graph these profiles, and examine and interpret them more closely. The application will be based on a software solution that feeds into a database to carry out comparisons and make interpretations.

Similar to KODE, a test that conducts personality and competence diagnostics, the Steinbeis Company Competence Check (UKC) takes into account how people see themselves and are seen by others. The self-assessment mainly involves the "Quick Check" using software. Within no more than 20 minutes, users are able to carry out a self-assessment based on preformulated postulations and questions relating to key areas of company competence. The system then immediately generates an automated evaluation, complete with diagrams.

The external assessment mainly revolves around an encompassing called "Master Check." This assessment involves a detailed catalog of questions, capturing and examining all key areas of company competence. The result is automatically provided to the consultant with a detailed breakdown and evaluation of the company's competence profile, including key strengths and weaknesses as well as specific areas of potential improvement and possible actions. The tool will make it easier for consultants to examine competence in a more structured way relieving the work-load by already producing an automated report.

The Steinbeis UKC is based on the business-check-concept developed by Prof. Dr. Werner Bornholdt, the long-standing director of the Steinbeis Transfer Center for New Products. Bornholdt's approach is based on an holistic view of the company's competence structure. His check can be



considered an extended variety of the balanced scorecard. For Bornholdt, the subjective perspective is essential when measuring and evaluating company competence. As a result, to develop the UKC, the Steinbeis experts first selected the purely quantitative indicators used in Bornholdt's concept. These feed into a "Fact Check," which is supplemented with a number of other quantitative indicators to provide the user with a brief quantitative profile of the company being assessed, before the actual main check.

This main check is then used purely as a qualitative instrument. It draws on the qualitative assessment of respondents to examine the company's competence. The approach makes a distinction between four areas of competence that are considered of central importance in the literature: knowledge, leadership, innovation, and communication. Each of these competence-levels is subcategorized into two "Check Levels." So in the competence area of knowledge, there are resources (knowledge bases) and learning (the willingness and capacity to acquire and develop knowledge). In leadership, the second competence-level, there are strategy and personnel. In the third competence-level of innovation, there are the subcategories of processes and products. Finally, the fourth level of competence, communication, includes networking (collaborative and transfer relationships) and markets (market image and market skimming).

Each of these eight dimensions is broken down further into three sub-dimensions, so that overall there are 24 sub-dimensions within the concept. These 24 sub-dimensions are operationalized by qualitative indicators, which find their expression in preformulated questions and postulations. For Quick Check testing, respondents (the people carrying out the check) are asked three questions or given three postulations per lower level (or around five questions/postulations per lower level for the Master Check). So with the Quick Check, there are around 72 questions to answer, with the Master Check there are around 120.

The Steinbeis experts' project is undergoing a consultation process, with close and early involvement of internal and external partners, potential users (consultants and managers) and other key players. There are also regular project team meetings involving Steinbeis staff as well as external partners from business and academia. Their task is to agree key strategic decisions and issues affecting the project. A major priority of the project team members is to actively involve potential users early in the development process, and to test and keep developing the concept in practical application through several rounds of feedback. Users should have plenty of opportunity to provide active input throughout the development process through comments, ideas, and criticisms, thus shaping the outcome. A pre-launch pretest with consultants and companies to allow the competence check to be used with a larger sample group and be evaluated methodically is an essential milestone for the project.

Apart from the development of the instrument itself, the development of the analytical process and a related certification program for Steinbeis consultants are other important aspects of the project. The results of the pretest and the project's overall development process will be issued by a study scheduled for presentation at the next Steinbeis Consulting Day on July 3, 2014.

More information and details of how to register online for the Steinbeis Consulting Day on July 3, 2014 are available at www.steinbeis-consulting-tag.de.

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The value of your own people

Steinbeis and zeb carry out HR study at banks and savings banks

The two main findings of an HR study carried out at small and medium-sized financial institutions in Germany, Austria, and Switzerland were (a) that it is extremely difficult for small financial institutions to solve personnel problems on their own and (b) that top quality sets banks apart from average service providers. The study was the work of zeb/business school, a Steinbeis Transfer Institute at Steinbeis University Berlin (SHB), in collaboration with the consulting company zeb.

The study involved 832 company directors, managers, and HR specialists at 527 financial institutions. It found that HR work at small and medium-sized banks is caught "between a rock and a hard place": personnel costs are rising, fewer and fewer people are working in sales, and – more than anything – corporate banking needs to grow. Capacities in the HR department have slumped 30% in the last four years, HR development costs have risen 20%, and the demands placed on HR departments have intensified severely. Despite the lower headcount, HR managers are now expected to provide more professional support, recruit new corporate client consultants from empty pools of applicants, while still lowering HR costs in the long term. Industry associations have been demanding stronger sales departments for years – they should account for a good 60% of employees. In 2009, just under 50% of employees worked in sales; now only 43% do. According to the survey respondents, the lower headcount in personnel is unavoidable. Around 50% of respondents believe that they can reduce HR costs as required by simply not replacing people when they leave, although 16% stated that there could be job losses. However, a major drawback with losing people through "natural fluctuation" is that the average age of staff rises and there are no new up-and-coming replacements. To cover the future need for sales people through home-grown replacements, the number of trainees and people retained in sales would have to rise by one third. In reality, trainee numbers are stagnating.

Small and medium-sized banks are poorly equipped to win the battle for the best terms and conditions, but they can win the battle for customers. This will require a reorientation in sales, away from the focus on selling and advising people mainly on which product they need, to focusing on the frequency and quality of customer contacts, with clear task and quality goals. This entails a fundamental change in target-setting and incentive schemes, as well as staff management and development in sales.

The extent to which banking depends on personnel is reflected by the correlation between quality standards and financial indicators. Measuring the quality of HR managers according to benchmarks of the European Foundation for Quality Management (EFQM), the top 25% are above average in terms of costs and revenues: 96% of the quality of HR management is dictated by the cost of HR; 63% of the time it is down to the cost-to-income ratio (CIR); 55% of quality relates to net profits (after tax). But this does not necessarily mean that financially successfully banks are good in terms of HR management. "The primary hallmarks of good HR management are strong competences in change management and close support for managers," explains the Steinbeis expert, Prof. Dr. Joachim P. Hasebrook, summarizing the results of the study.

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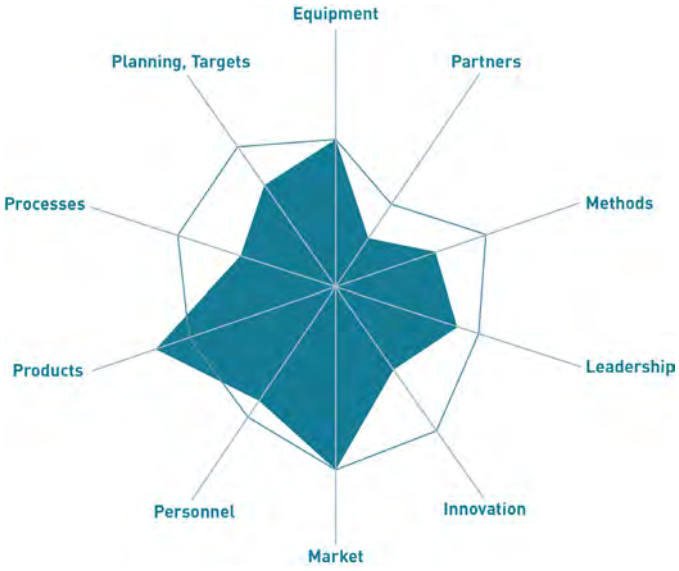

Design and development checks unveil potential

Work on successful Steinbeis projects being handed on to colleagues

Even if it can take many months or even years for development work to bear fruit, no one denies how important design and development (D&D) is to the success of a business. But can the product development process (PDP) practiced within a company also secure future success? How can companies estimate the appropriate levels of D&D resources, or leverage potential, or organize the overall PDP efficiently? Two medium-sized companies from the fields of drive technology and temperature control equipment used in manufacturing processes grappled with these questions. And they found answers – thanks to the work of Steinbeis.

The drive technology producer, a business from the German region of Franken, offers a broad range of products including spur gear and planet gear motors as well as angular geared motors – with an emphasis on customized solutions. Bridging the gap between series production and tailored one-offs, in addition to tripled sales volumes over the course of ten years, made it necessary for the manufacturer to rethink D&D structures and the processes followed in the PDP. In collaboration with the experts from Steinbeis, the Steinbeis PotentialCheck was used to assess the situation in the D&D department and examine the PDP process. One of the main goals was to identify quick wins and make the structure of D&D more future-ready.

Based on the results of the analysis, procedures used to develop ready-to-mount system solutions for customer-specific projects were merged with the in-house development process. By restructuring personnel, centralizing certain activities into one location, and introducing project managers to work on individual segments, engineering was reorganized to work more effectively, focus more closely on market needs, and react more quickly to changing requirements. As a result, it became possible to acquire international projects which were also successfully implemented. In certain specialized market segments, the company gained market leadership. To help with planning and costs, the Steinbeis experts also provided support with the introduction of enterprise software which is now used as a management and financial monitoring instrument in D&D. The next step will be to expand the existing system and set up a D&D dashboard to integrate management and communication within the department.

The success of any company is primarily a function of its people. To do justice to the increasingly demanding projects carried out in D&D, a medium-sized producer of temperature control equipment used in manufacturing processes recognized the need to optimize the constellation of people working in project teams. The Steinbeis experts invited to help with the project also decided to use the Steinbeis PotentialCheck instrument. Mixed teams of company employees and Steinbeis experts defined a made-to-measure list of key criteria. During this process, the Steinbeis experts were able draw on a wealth of experience involving appropriate criteria and evaluation benchmarks. Running the checks involved answering the following questions: What strengths and potential are offered by Person X compared to the average of other D&D employees? Which D&D employees are in a position to assume responsibility for projects and what can be done to expand the pool of project managers overall? One result of the collaborative project was that suitable training measures could be identified for individual employees. Some went on seminars specially developed and provided by Steinbeis D&D for employees and managers. Although originally skeptical, even the works council was impressed by the results after the project ended.

The Steinbeis PotentialCheck is just one of several services that have been developed and used many times by the Steinbeis Transfer Center Production and Management (under the direction of Prof. Arno Voegele) over the past 25 years. This has primarily been for medium-sized enterprises. As part of a business succession arrangement, this work will be continued by Stephan Rimpl, Oliver Brehm and Georg Villinger at the Steinbeis Transfer Center for Development, Manufacturing, and Management. The plan is to continue expanding work in "technical management" services and seminars. The three Steinbeis experts are highly versed in the process chain required during the product development process. The center works as a partner to small and medium-sized enterprises on technical management projects.

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The engineer's role as a development manager

Training course at SHB under new management

Our modern economy has put innovative management, influential character profiles, and practical problem-solving skills in high demand. There is a call for employees to bring in new ideas and strategies that are geared toward the market, and to implement these successfully in the development of competitive products and services. The extra-occupational course in "Development and Design Management" offered by Steinbeis University Berlin (SHB) has been tailored to the needs of just this target group, examining the overall context of key issues that will define the future.

Engineers are being asked to redefine how they see themselves, to an even greater extent if they are involved in complex projects or are in executive positions with organizational responsibilities that include HR management. The aim of this course is to provide further education and professional development for people in development and design (D+D) with management potential. The course covers materials that D+D managers may need in order to:

- Successfully handle complex tasks in internal and external networked systems
- Expertly lead a team of enthusiastic employees
- Deal with tasks effectively and efficiently
- Derive and implement key actions based on the right strategies
- Confidently answer technical and business-related questions posed by colleagues from other specialist areas

The study program, now completed for the 36th time, has seen more than 600 students successfully finish the course, ensuring they receive skills-based training for their work in engineering. After many successful years establishing the course under Prof. Arno Voegele, the course has been under new leadership since the beginning of this year. Berthold Villing, director of the Alb-Schwarzwald Business School, a Steinbeis Transfer Institute at SHB, is now responsible for the administration and curriculum of the program.

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Now's the time for health care specialists

SHB certification course to become an EOL heath care coach (SHB)

"Simply adding a juice bar at reception and making sure each office is equipped with ergonomic chairs doesn't go far enough these days" – a clear statement made by Prof. Dr. Kilian Mehl, head of infer (the Institute for Experiential Learning), expressing his view on modern occupational health care management. Together with unisono, the Steinbeis Transfer and Competence Institute at Steinbeis University Berlin (SHB), infer offers a certification course for coaches, training staff, and people involved in health improvement and maintenance. Successful completion of the 5-module course earns participants higher education certification as an EOL Health Coach (SHB).

The introductory module is based on experiential teaching methods. The Balanced Individual module, which is held at the rehabilitation clinic in Isny in Allgäu, covers effective methods of health promotion. The Healthy Organizations module focuses on occupational health care management. It probes deeper into issues relating to effectiveness, awareness, and the successful implementation of health care instruments within business environments. The 12-day training course as a health coach is held primarily at clinics in Wollmarshöhe and Überruh, which are both located near Lake Constance. The next course is scheduled to start in October 2014.

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EU 2020 – Gearing SMEs toward Europe

Master of Science in European Innovation and Technology Management

Horizon 2020 is an EU research framework program that focuses primarily on application-based activities, with plans to cover more of the complete innovation cycle in the future. At this point in the program, organizers are calling on smaller, more innovative companies to become actively involved. This also involves a new degree program towards a Master of Science (M.Sc.) in Innovation and Technology Management, with a major in European Innovation and Technology Management. The program will be offered as of June 2014 by the School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin in cooperation with the Steinbeis-Europa-Zentrum.

The degree program is geared toward highly motivated, talented young professionals from the fields of engineering and science, who's work areas overlap with management in small and medium-sized enterprises (SMEs). It is also open to people with a business background who work closely with technology and engineering.

Key skills for business mediation

Steinbeis trains mediators

More and more businesses are calling for people with mediation skills. As business is becoming increasingly complex, there is a corresponding rise in the potential for conflict. The Steinbeis Consulting Center for Business Mediation has teamed up with the Steinbeis Transfer Institute Academy for Social Aspects and Law at Steinbeis University Berlin to offer a training course for mediators, which culminates in a university certificate.

The aim of mediation is to facilitate between conflicting parties through an arbitrator, who helps those involved come to an agreement. The communication techniques used in mediation are useful in uncovering potential conflict areas early and mitigating the effects before things escalate to the conflict level, which can ultimately be very costly for companies. Mediation training also serves to prevent conflicts and strengthens personal behavior in conflict situations, allowing people to react better. This contributes greatly to better results in team meetings and facilitated workshops.

Mediation has been embedded within the German legal system with new mediation legislation. It defines qualification standards for mediator training. The Steinbeis course meets these criteria and gives participants a solid basis for working as a mediator within business environments. Other key topics that have recently been integrated into the training curriculum include issues like dealing with emotions and gaining insights from online communications. The interdisciplinary team of instructors made up of Dr. habil. Gernoth Barth, Bernhard Böhm, and Cordula Söfftge bring to the course their unique professional experience from a variety of fields (pedagogy, law, psychology). Representing both genders, the team also keeps the training course varied by introducing appropriate mediation techniques from different perspectives.

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From manager to leader

SHB certification course for becoming a Leadership Manager

Many managers feel so overwhelmed by daily business that there isn't much time left over for doing what their position actually demands – leading a team. In cooperation with human resources development specialists Wiltraud Johanning-Natzke and Wolfgang Natzke of jobperform®, the Steinbeis Transfer Institute for Business Management and Innovation at Steinbeis University Berlin has developed a business-oriented training course for potential leaders to become certified leadership managers.

In many cases, this holistic approach offers clear relief for managers in their daily leadership role. The program is divided into eight separate modules which run over the course of a year. Each module lasts three days, each followed up by work on a case study. In parallel, participants are expected to work on an actual business project which ends with a project presentation after completion of the eight modules. Together with the course instructor, the participants analyze their daily management work and develop their own management strategies. They learn to navigate the challenges they face as a manager and tackle these head on. The course is intended for professionals in middle and lower management with previous experience who wish to accelerate their career. That said, the course may also appeal to newcomers who want to strategically plan their management role.

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The degree takes an in-depth look at innovation and technology management, EU structures and institutions, and the opportunities offered to SMEs by European project funding. This enables students to face the complexities and ever-increasing pressures that are driving innovation within their own companies at an international level. The degree program has been based on SHB's proven project competence concept, in which the curriculum is closely dovetailed with business practice. As part of the degree, students have to pass examinations and this forms the basis of an EU funding application within the scope of the EU 2020 strategy for fostering innovation, thus providing direct benefit to the companies sponsoring the students.

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HORIZON 2020 – the new European Framework Programme for Research and Innovation

TRANSFER talks to Professor Dr. Norbert Höptner

Professor Höptner, last January, the European Union kicked off a new round of funding with HORIZON 2020. What's new about this programme compared to its predecessor, the 7th Framework Programme for Research?

HORIZON 2020 is the first programme to combine activities that were previously kept separate – things like the Framework Programme for Research and Technological Development, the Competitiveness and Innovation Programme (CIP), and the European Institute of Innovation and Technology have now been brought together. The European Commission hopes this move will better harmonise the funding instruments. With a total funding of €77 billion earmarked for the time period between 2014 and 2020, the programme has a much bigger budget than the 7th Framework Programme for Research. HORIZON 2020 is an important pillar of the Innovation Union, one of the primary initiatives of the Europe 2020 strategy that was developed to foster European competitiveness worldwide. To ensure that Europe can continue to tap into opportunities in the future, the European Commission has decided to focus on three main issues. These include excellence in science, industrial leadership, and societal challenges. This places explicit emphasis on three very relevant areas: science, industry, and society.

Who is the program's target group? What opportunities are available for companies based in Baden-Württemberg?

The issues of societal challenges and industrial leadership are subsidized by funding programmes that might well be of interest to businesses and research facilities in Baden-Württemberg. These programmes support transnational cooperation. Any legal entity within EU member states, associated states, or third countries is eligible to apply. Unlike with previous SME programmes, this new SME instrument allows for individual applications. To receive funding, the SME must produce a business case defining the scientific scope and involvement of a research service provider, which is obligatory. It should also outline the company's business needs and opportunities. The SMEs can subcontract scientific partners. This SME instrument is part of the programmes focus on societal challenges and industrial leadership. 20% of the budget is reserved for SMEs in these two programme pillars. We have excellent researchers in Baden-Württemberg and they should definitely apply to the program for excellence in science. Doing so could garner them project funding through the European Research Council. A lot of potential options are also open in the area of research infrastructures.

Have the funding instruments changed? What do companies have to consider?

The EU Commission funds projects throughout the complete innovation cycle – from initial research to market launch. As a general rule – with the exception of support for individual projects – a project is applicable for funding if it includes at least three independent institutes from three different EU member states or associated countries, but the consortia are generally larger. HORIZON 2020 only offers two different funding levels for direct costs: 100% for research projects and 70% for innovation projects (activities deemed "close to the market"). This funding quota then generally holds for each project and all of its activities. Exceptions apply to non-profit organizations – they can receive up to 100% funding allowance to cover their direct costs, even for innovation projects. The funding of indirect costs is set at a fixed level of 25% for all project types. More and more market-ready products are based on research, and funding measures for this have been simplified.

What are the chances of an application being accepted? To what extent does the Steinbeis-Europa-Zentrum offer support?

Our experience shows that it isn't easy to apply for EU funding, especially for SMEs. It is particularly difficult for first-time project coordinators. We recommend that newcomers join a project as a partner first. The Steinbeis-Europa-Zentrum offers help in preparing the application. Our consulting substantially increases the project's chances of receiving the funding. We help companies, universities of applied science, and research institutes apply for project support and also help them manage and coordinate projects. For example we support them look for suitable project partners and negotiate contracts with the European Commission. Our newsletter and our many informative events in Baden-Württemberg provide free information about these European programmes and the available funding options. What's more, our special training series on the project bidding process and project management provides detailed training in small groups. The trainings were designed for companies and universities who have already worked on EU projects or who would like to start doing so.

Prof. Dr. Norbert Höptner is director of Steinbeis-Europa-Zentrum and the Commissioner for Europe of the Minister of Finance and Economics of Baden-Württemberg.

Steinbeis-Europa-Zentrum (SEZ) was founded in 1990 as the operational unit of the Commissioner for Europe of Baden-Württemberg's Minister of Economics. SEZ's core activity is to promote European RTD programmes and to support cross-border technology transfer. Target groups are small and medium sized enterprises, universities of applied sciences and research facilities.

With offices in Stuttgart and Karlsruhe, SEZ offers support with a variety of activities relating to international projects, particularly the identification of project partners, project management, technology transfer, and the development of innovation strategies for enterprises, public authorities and regions. Steinbeis-Europa-Zentrum is the first contact point for SMEs in Baden-Württemberg, acting under the auspices of the Commissioner for Europe. SEZ also acts as an EU contact point for universities of applied science in Baden-Württemberg on behalf of the Ministry of Science, Research and the Arts. It also acts as a regional INTERREG contact point for the Ministry of Finance and Economics.

SEZ is a partner in the European Commission's Enterprise Europe Network and a partner in the Consortium of Baden-Württemberg in cooperation with Baden-Württemberg skilled crafts organisation, Handwerk International, as well as the Ministry of Finance and Economics and seven chambers of industry and commerce.

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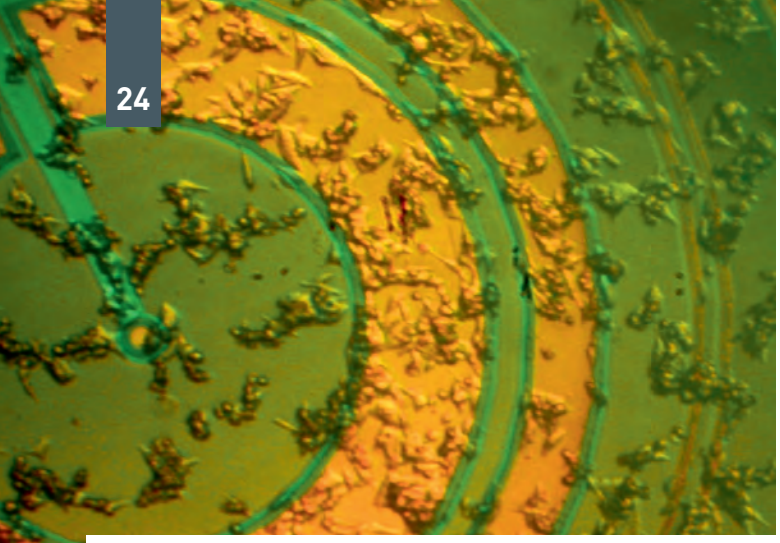

Bio-analysis “to go”

Steinbeis develops mobile measuring device to record toxicity

Pesticides in vegetables, antibiotics in meat, expired goods – frequent scandals in the food industry are making consumers more and more critical. That’s why the Heinz Nixdorf Chair for Medical Electronics at the Technical University in Munich has been researching test systems for many years now, which are making it possible to accurately analyze the effects of medications, pesticides in foods, and other environmental toxins. As a result of this research, experts at the Steinbeis Transfer Center for Cell Chip Technology have developed a miniature mobile device for use in frontline applications in the field.

The research was based on monitoring cell activity: Observing the reactions of a specially selected cell organism to specific substances, researchers can draw conclusions about the potential reactions of other organisms such as the human body. The cells continually integrate various physical and chemical signals from the environment in order to “calculate” the suitable reaction. This behavior manifests itself in the decision of cell division or cell death, in the activation of certain metabolic pathways, or the production and release of proteins. As part of the project, these micro-physiological parameters of sensitive cell cultures where recorded when the cells came into contact with environmental toxins – in and outside of the lab. These parameters were recorded through so-called automated agent testing in which cell signals are registered and analyzed through sensor chips.

The Steinbeis Transfer Center for Cell Chip Technology developed a mobile device for this process of identifying active agents that affect cells. This was intended to meet the requirement of finding a fast-track method which could be applied outside of the lab. A chip is inserted into the device which is then coupled to a fluidics system that periodically supplies the cells with fresh substances. Its specially designed bioelectronic microsensors and the selection of a suitable organotypic “target” cell culture can then precisely record the in-vitro toxicity of substances. The practical testing device measures changes in the metabolic activity of the cells before, during, and after the test substances have been applied. Under certain conditions, this toxicity can be used as an indication of the effects it would have on the human organism. First trials of the method investigated the effect of commonly available fungicides on the vitality of yeast cells.

The process has already proven itself in practice. The prepared physical data and processed digital data are immediately sent to an online database. After the measured data has been analyzed, the user receives direct feedback regarding, for example, the toxicological evaluation of the substance.

The biosensor chip used in this “biohybrid system” has been named a cellristor®, analogous to a transistor, since it controls biological signals in the cell and the electrical current in the electronic component. The sensor chip contains the physical sensors used to capture the signals of the living organism. A life support system ensures that an in-vivo type micro-environment is achieved for the tested cells. The device construction is highly complex, functioning as a systems platform with a host of integrated mechanical, microfluid, and electronic components as well as microsensors. One of the greatest challenges the project faced was how to integrate everything into a single, functional system; that is, the precise coordination of all system components to meet the goal of real-time monitoring in exceptionally sensitive cells. Another difficult issue related to environmental analysis relates to the appropriate extraction of ingredients from raw test materials and their transfer to a suitable culture medium.

The biosensor system, which is based on using living cells as signal exchangers, poses an interesting alternative to existing measuring devices used in environmental monitoring. It can also be used to complement such devices. The low operating costs and ability to tap into a mobile signal network offer researchers a lot of flexibility when analyzing the effects of environmental toxins. Automatically analyzing and evaluating measurements make it possible to quickly identify environmental hazards or the occurrence of specific pollutants in water. Using living organisms also allows for targeted reactions to any kind of toxin, which can generally only be achieved through sophisticated chemical processes.

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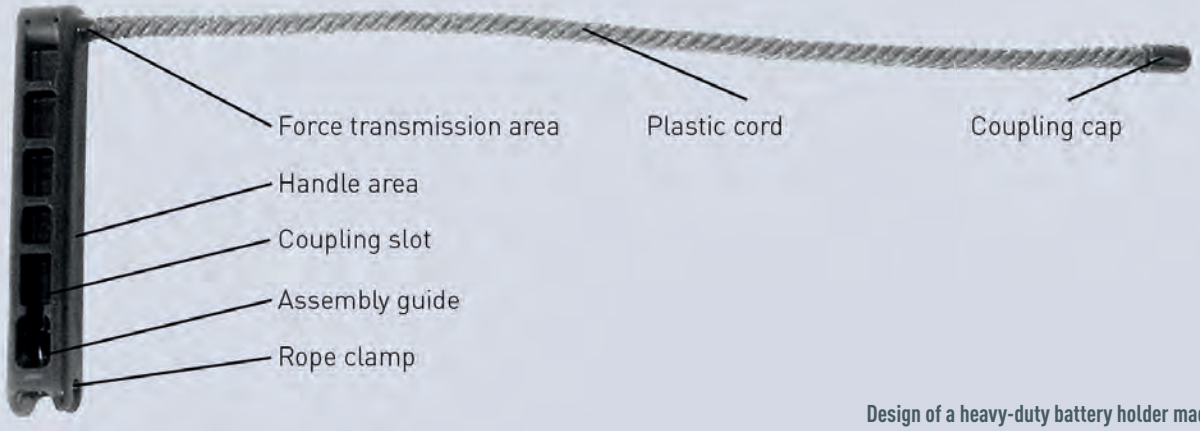

Design of a heavy-duty battery holder made of hybrid material

Cast from a single mold

Steinbeis contributes to the development of a novel battery holder made of a textile/plastic hybrid material

The demand for components in the automotive industry continues to grow: OEM strategies geared toward standardized parts, legal requirements related to recyclability, and current trends toward comfortable, high-performance, lightweight construction are raising the bar for component suppliers. With this in mind, the Steinbeis Research Center for Automation in Lightweight Design Processes (ALP) has teamed up with the polymer processing company Hugo Stiehl, the faculty chair of the Department of Lightweight Structures at Chemnitz Technical University, and Cetex, a private research institute based at the same university. Together, they have successfully implemented a new and innovative technology concept. Using a battery holder as the basis for their work, the project partners were able to develop a novel technical process for creating an assembly line for components made of textile/plastic hybrid materials.

The aim of the project was to manufacture a battery holder in a fully automated production process with quality controls in place for each step of production. The project's key challenges included packaging, preparation for delivery, as well as mounting the inserted component on the tool and coupling the textile cord with the formed mold. To do this, process steps had to be devised that come before the actual injection molding process. The project team was able to demonstrate that it is possible to meet complex requirements for the production of components for the automobile sector. This can be done through the application of new and innovative textile/plastic hybrid technologies and the use of homogenous synthetic materials.

The battery holder can handle forces of up to 3,200 N, has a mass of 21g, and is made of hollow polypropylene (both the holder and the textile component). The cord material is a twisted, fibrillated polypropylene band sourced as a raw material. The material is pulled from a roll, fed through a guide channel, and then reformed with a heated molding unit. This allows the material to bind better with the injection molding unit. The cord is subsequently shortened to the right length using heat cutters. At the same time, the twisted ends are sealed. After this, a handling system positions the workpiece and transfers it to the single-cavity injection molding tool.

A particular challenge when working with textile/plastic hybrid materials is how to couple the plastic, and how to position and seal the components mounted on the injection molding tool. Additional parts on the molding tool hold the inserted workpiece in place when the tool is clamped in position and secure the alignment of the movable cord in the cavity during the filling process. In addition, it is important that the cavity is sealed despite undefined contours and production tolerances for the inserted textile component. To achieve this, the project team fixed the textile insert in the tool in two stages. To prevent the inserted cord from deforming due to intrinsic tension or external forces and to keep it in the right position in the cavity, clamp grips are used from and to the end effector on the robot. The insert's position is secured with needles during the injection molding process. These needles are incorporated in the cavity and they hold and lock the end of the cord in place. The insert is sealed in the cavity through a crimping edge, which primarily shapes the inserted cord elastically without significantly damaging the fibers.

To ensure the battery holder can handle the necessary loads, the developers placed a lot of emphasis on the coupling of the textile cord in the injection molding process. If the undercut is not designed properly, or if the plastic and the cord are not coupled sufficiently in the injection molding process, the holder will fail because the cord could be tugged out of the plastic component. This would not achieve the required composite strength.

The project partners developed and built a pilot facility for manufacturing the battery holders based on the process schematics. This facility helped to demonstrate the feasibility of the production process as well as the high performance of the finished component.

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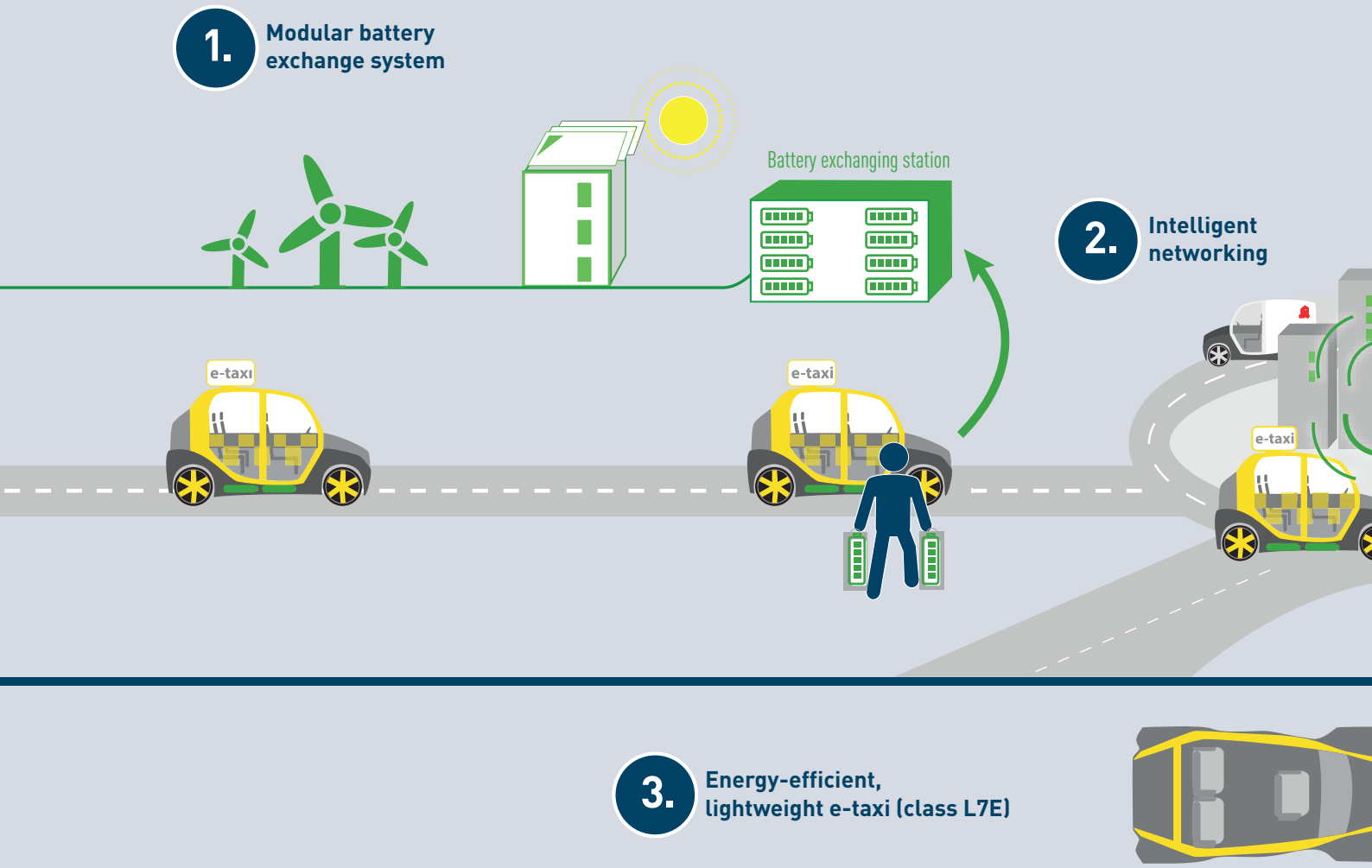

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Zero emissions: E-mobility organized at a regional level

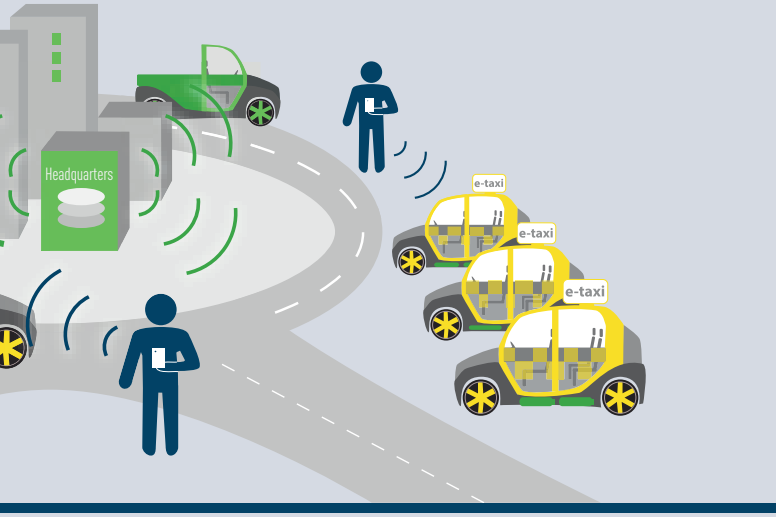
New business models needed as technology advances

Until now, electric vehicles have been regarded as expensive and uncertain in terms of the distances that can be covered with the existing technology. Now, four high-tech companies have teamed up with the Fraunhofer Institute for Embedded Systems and Communications Technologies (or ESK) to develop a future-ready mobility solution that's based on a comprehensive intelligent system. Yet a comprehensive system also calls for new collaboration and marketing models. Only if this is achieved will it be possible to offer a solution for everyday mobility applications at a competitive price versus conventional combustion engines. The Steinbeis Consulting Center for Technological Advancement & Project Financing sees its core competence as the development of technology-based business models. This know-how allows it to make important contributions to this new project by working with the partners to develop a new business and operator model coined "regional operators organize e-mobility."

Preparation for this project involved securing funding for the medium-sized business partners involved – primarily through backing from a government program called IKT-EM II. The consortium, made up of the companies Vispiron, Heinzmann, Roding Automobile, the BMZ (battery assembly center), and Fraunhofer was cleared to start developing a "comprehensive, emissions-free system for cities."

The project partners developed an electrically driven vehicle (class L7E) made of lightweight construction materials. In addition, it developed an intelligent hardware and software system and a low-volt battery module, allowing for easy exchange of the battery pack. For users, the result was a compact, intelligent vehicle that can transport people or goods. Transportation systems are not achieved by selling individual vehicles. The vehicles have to be made available through a centrally managed e-fleet. Working with renewable energy providers and using battery exchange stations underscores the e-fleet's status as part of an emission-free system. The vehicles are much more modern and environmentally friendly, since they have been designed in line with modern environmental requirements and the needs of people living in cities.

Operating e-fleets means setting up suitable operator systems. These operators organize the infrastructure and make vehicles available to drivers: organizations, companies, or even private individuals. Usage is invoiced through simple and transparent rates. The consortium is plan-



Steinbeis Consulting Center
Technology Promotion & Project Financing

Services

- Technology promotion and consulting regarding funding
- Project financing and growth financing
- Creation of concepts, business plans and expert reports
- Strategy and innovation consulting
- Financial engineering (special situations, project financing)

Key Areas

- Fostering of R&D, business innovation and innovative enterprise start-ups
- Financing of innovation and expansion projects
- Financing under special circumstances (succession, change of company directors, etc.)
- Growth financing with investments totaling more than 50 percent of total assets
- Information on innovative financial instruments

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IKT FÜR ELEKTROMOBILITÄT

CITY eTAXI Emissionsfreies Gesamtsystem für Städte

ning its first steps by introducing test fleets through operators in Aschaffenburg and Munich. These operators will provide e-fleets – each with at least 20 vehicles – to companies and organizations. They foresee uses such as e-taxis, e-city logistics, communal fleets, and carpooling (where people or organizations share a collection of vehicles). Based on fleet tests, the consortium will make systems know-how as well as hardware and software solutions available to regional operators.

The role played by the regional operator networks is to promote use through their knowledge of travel demand in a given area and their ability to network intelligently. It all comes down to usage rates: if these are too low, this affects costs (higher per mile) and makes the solution less economical. Once costs (per mile) are reduced to below that of combustion engines, e-mobility will enjoy wider acceptance.

The project partners have every reason to be optimistic: At the moment, the costs for the e-fleets are lower than the costs of combustion engines. Payment plans based on usage mean these cost advantages can be handed on to users by regional operators. The better value for money means quicker market penetration. The project shows: new business models are needed as technology advances. Paul Leibold, coordinator of the consortium project backs this up: "When embarking on complex, innovative endeavors, I recommend the support offered by the Steinbeis Consulting Center for Technological Advancement and Project Financing. Their team offers skills and knowledge that strongly contribute to project success. In addition to the specialist knowledge they offered, the center knew exactly how to reconcile the interests of each project partner in line with the groups' shared goals."

For more information, please visit the website for this "Adaptive City Mobility" (ACM) project.

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Founders' open day for startups

Steinbeis offers free consulting sessions

Since 2012, Steinbeis has stood as a project sponsor of a program backed by the European Social Fund (ESF) called the EXI Startup Bonus. Through this program, Steinbeis supports young entrepreneurs in the development and implementation of their business concepts. The scope of support covers everything from checking business plans to successfully establishing the companies. Nearly 600 pre-startup consultations have been held over the past two years or so. The aim of these consultations is to provide would-be startup managers with solid instruments, methods, and decision-making aids throughout all phases of the startup, and to support these young companies in the delivery of their business concepts.

Starting a business is always fraught with challenges which demand thorough market research and the courage to take that step toward self-employment. It helps to get as much support and feedback from third parties as possible. This is precisely what the startup initiative backed by the state and the ESF can offer. To ensure that startups are systematically guided along the path to entrepreneurship, a multitude of questions need to be answered right at the start. Some of the important issues that need to be addressed include:

- Do I have the right personal and professional skills and qualifications?
- Is my business idea promising? What risks might I face in setting up a business?
- Who are my customers, and how do I best reach them? What sets me apart from the competition?
- What are my financial requirements? Are my business expectations realistic?

To answer these and possible follow-on questions, people interested in entrepreneurship can book consultation sessions that are funded by the EU and the state of Baden-Württemberg.

Free initial consultations are geared toward anyone thinking about starting a business in Baden-Württemberg, who might need feedback in this initial reflection phase. The consultation bonus allows for up to eight hours of consulting and sessions are free of charge for the founder. Additional topics that might be significant for the startup or the business plan are then identified in a full-scale consultation. These full-scale consultations can cover up to 10 days and they are offered to the founders at preferential rates.

Anyone currently in the orientation phase for a potential business startup might find it useful to discuss their ideas with a specialist and reflect on them. Steinbeis is now offering a helping hand with regular appointments for potential founders at the Haus der Wirtschaft in Stuttgart. In these private, one-hour sessions, Steinbeis consultants answer questions related to startups and entrepreneurship – all within the framework of the EXI Startup Bonus. These appointments are free of charge.

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Ready for the renewable energy reforms?

Steinbeis reports on potential changes

Sigmar Gabriel, Germany's Federal Minister for Economics and Energy, has announced his plans to reform the German Renewable Energy Act (or EEG). A number of the intended changes will have a considerable effect on previously planned projects. Viable projects should continue to receive funding, but these will demand a measure of flexibility as things continue to change quickly in the sector. Here too, Steinbeis offers professional consulting.

The most important thing for project initiators and investors to think about is professional planning and preparation. The following aspects should be kept in mind:

- To what extend is the federal government considering changes to the laws that might affect planned technologies?
- How will these changes affect profitability and the likelihood of a technical system gaining approval?

Adapting to changes during the assessment makes it easier to evaluate possible scenarios. This makes it possible to react quickly to potential changes in the law, as early as the planning phase. The past has shown that intended funding cuts are often kept more moderate in the actual legislative process. That said, it is important to consider different planning scenarios and assessing whether a project will break even, particularly for projects planned to begin after August 2014 (by when the EEG amendment will take effect).

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The future of relationship management – at home and at work

SHB graduate develops processes for managing relationships based on optimized algorithms

For his degree program at the Steinbeis School of Management and Innovation (SMI) at Steinbeis University Berlin, Christoph Köpernick developed a social networking app called Locadeo. The aim of the app is to ensure contacts are not neglected, neither on a personal nor on a professional level, by helping users find just the right gift or experience to keep relationships running smoothly and strengthen ties.

A whole variety of online services already claim to be able to help you identify the right present for somebody. So what is so special about Locadeo? "Our aim is to find the perfect idea, but in essence Locadeo should reduce the time invested in research and provide new impetus," explains Köpernick, who submitted a business plan for Locadeo at the end of 2012 as part of his master's thesis for his degree in digital management.

Students on the master's program generate new insights, drawing on scientific methods but with a focus on practical application. The aim is to apply these ideas to their work or a business startup, and by the end of their studies they should have a concept pertinent to business practice and underscored by scientific theory. This was also the process undertaken by Christoph Köpernick to draft a business plan and derive a product concept for Locadeo. The courses that provided him with particularly useful insights and the knowledge he required to draft his business concept and business plan included trend scouting, Internet markets, online marketing, online media consumption habits, and the foundation and funding of digital innovations.

To translate his vision for Locadeo into a business reality, the inventor joined forces with the IT specialist Christian Baer. This resulted in the recent founding of Locadeo GmbH, which has been closely affiliated with the Steinbeis SMI since its inception. Even during the initial preparation stage of their project, the founders were provided with hands-on support by two SHB alumni, Ann-Kathrin Veenendaal and Kim Tina Haas, who helped with the strategic marketing and the positioning. Both have been helping the startup as part of the advisory board. The online marketing is being carried out by Tony Riedel who is studying marketing management at SHB. Frank Penning, a Steinbeis SMI lecturer who is the CEO of ProSiebenSat.1 Applications GmbH and also supervised Köpernick's thesis, is proud of the entrepreneurs: "The business concept is a perfect match with our fast-paced times, where friendships and relationships should be more meaningful than ever before. The Locadeo team is competent and has both the right attitude and the willingness to stick it's neck out for a successful startup."

The algorithm used by Locadeo suggests suitable ideas for presents and experiences by tapping into information about interests and preferences entered by friends on the social networking website, Facebook. Unlike comparable recommendation systems, however, Locadeo does not just categorize friends by types but also works out individual overlaps based on attributes.

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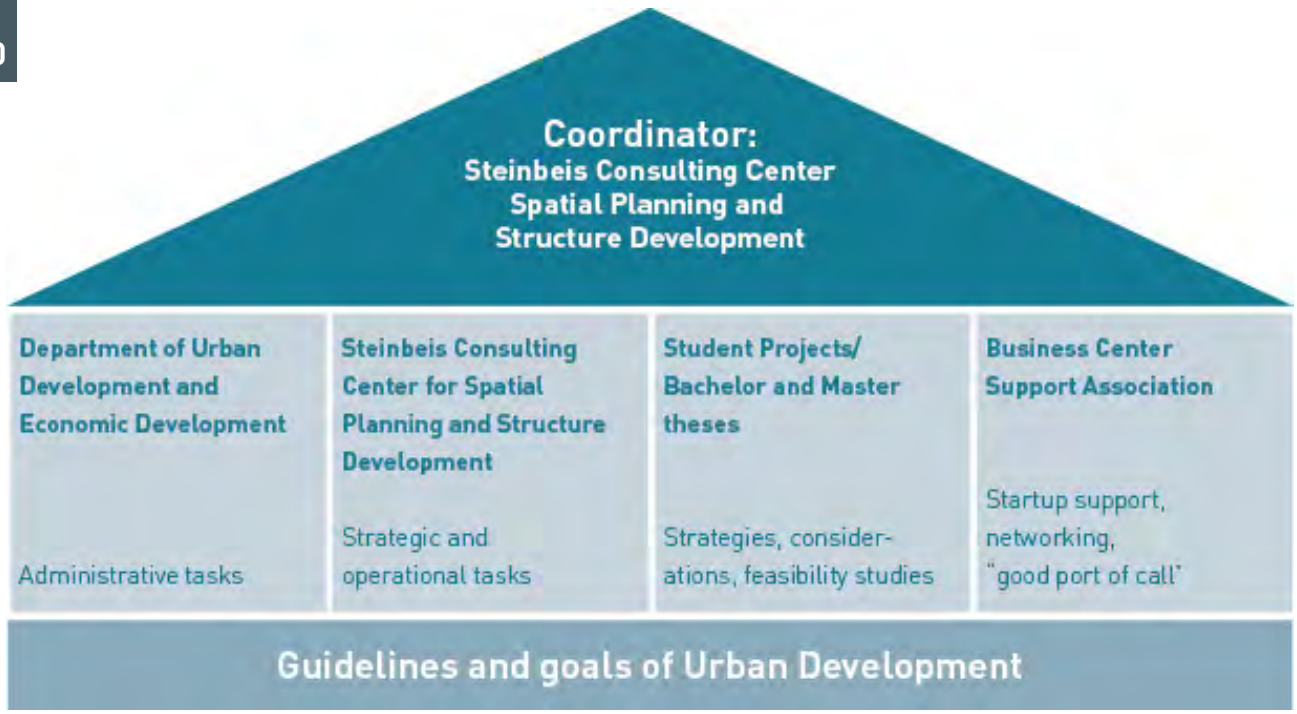

The structure of economic development in Meiningen between 2010 and 2013

Economic development as an instrument of urban developmental planning

Moving away from stand alone solutions to project-based processes

"We have a plan for urban development." This is the kind of statement that is often uttered by local politicians when talking about medium and long-term community planning. But as a rule, only traditional instruments are taken into consideration and as a result, the potential that normally could be offered by using economic development or transportation development plans remains unused. The fact that taking these plans into account is worth the effort, has been proven by the Meiningen-based Steinbeis Consulting Center for Spatial Planning and Structure Development.

The city of Meiningen, located in the German state of Thuringia, has suffered from nearly a 20% reduction in its population since German reunification. Most manufacturing companies have shut down or were totally restructured. Many new firms came along but there was no coordinated effort to develop certain industries. As a result, the number of tertiary sector firms became top-heavy, making it difficult to establish cyclical industry chains in the region. In many parts of Meiningen, economic development still took place on an ad hoc basis and change was long overdue. This was where the Steinbeis Consulting Center for Spatial Planning and Structure Development came in. For the past four years, the center has been busy dealing with economic development. From its office, the center has been managing projects within the remit of economic development as a champion and service provider for businesses. After handing the task to an external party, there was a sharp rise in companies' acceptance of the role played by economic development services. The transfer of knowledge from universities was achieved through a variety of student projects, providing companies with plenty of food for thought. Drawing on economic development guidelines established by the Department of Urban Development and Economic Development, a four-pillar model was developed for economic development in Meiningen. Steinbeis was given the task of coordinating this model.

Allowing Steinbeis to manage economic development shifted the approach away from solving individual issues to taking on entire projects. As a result, all companies were able to benefit from the economic development success. If problems arose, there were systematic procedures for tackling them, resulting in more transparency, less conflict, and faster outcomes for clients. Economic development established itself as a new impetus and a partner to help modernize administration providing many indirect advantages for local businesses. This project-based approach became a part of the shift in the emphasis of economic development, away from merely attracting companies to the area, but more toward more strategic campaigns. These days, what is needed is the pragmatic economic development within the community, with more simplified administration, quick action, and reduced costs at the local level. In the future, particular attention must be given to the regional, collaborative campaigns creating chances to implementing more comprehensive projects. One thing that proved to be an advantage in this respect, was the formal link to the Department of Urban Development and Economic Development. In addition, the contractual arrangement with Steinbeis meant that the project was supported by a "neutral third party."

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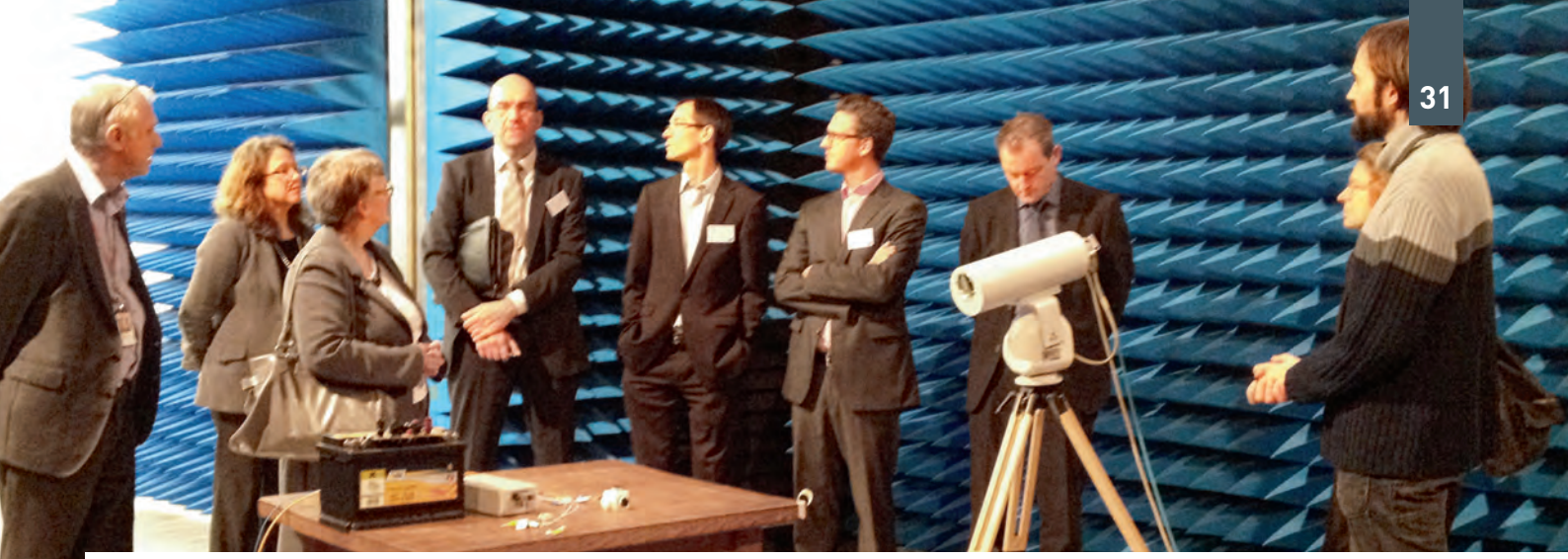

TransNetAero takes flight

Steinbeis is initiator of a transnational aerospace network

To make small and medium-sized European companies more competitive in the aerospace industry and to foster transnational cooperation in the field – these were two goals laid down at the end of 2012 by the TransNetAero INTERREG initiative, which was initiated by the German Aerospace Academy (ASA), a Steinbeis Innovation Center. In cooperation with five other aerospace regions in northwestern Europe, partner countries will organize various events related to the project between 2013 and 2015. These events will allow European suppliers to familiarize themselves with new technologies presented by systems suppliers and to network and establish contact with global industry players. The second main aim of the project is to develop an excellent education and training program. Certification courses and a EU Aerospace Master Program will not only secure a supply of specialists for the aerospace industry but also increase innovation in the supplier industry.

Nearly a year has passed since the ASA and the five partner regions – the Midlands (UK), Wallonia (BE), Normandy and Pays de la Loire (FR), the Netherlands and Switzerland – were given the go-ahead for the project. A lot has happened since then. Project strategies and targets were first presented in Germany at the annual Steinbeis Day in 2013, where they were warmly received by the audience.

As part of the project, under the leadership of the Midlands Aerospace Alliance (UK) R&D institutions and companies with specialized development and research know-how have been identified in the respective partner regions. An education task force was then subsequently formed out of these centers of excellence, which consults the TransNetAero partners on the development of education and training programs. A survey was conducted in all partner regions, focusing on education and training needs in the industry. A broad range of topics provides a basis for appropriate, practice based certification courses which will later be modules for the EU Aerospace Master Program. Both the certification courses and the Master Program are based on the Project Competence Concept of the Steinbeis University Berlin. Their focus is on knowledge transfer combined with practical application and business relevance. Other aspects of the project include developing individual businessplans and technology roadmaps, and these are to be customized to match the needs and opportunities for the small and medium-sized companies. Events to be held in the individual partner regions are intended to make the local skills base more evident and to improve the attractiveness of the region. With an emphasis on OEM requirements, SMEs should have easier access to supply chains. The aim is to connect the companies involved to form a transnational aerospace network.

The Midlands kicked off the series of events in November 2013 with the first workshop in the Manufacturing Technology Centre in Coventry. This two-day event offered suppliers from all across Europe the chance to get to know leading global systems providers. It also introduced two aerospace development centers: The Manufacturing Centre and the Institute for Aerospace Technology (University of Nottingham). Suppliers were able to forge contacts to global industry players. In the same month, the second event was held in Rouen, France. At this event, systems providers showcased their new technologies and presented the requirements that suppliers to the aerospace industry can expect to face in the future. At the end of March, the annual Lake Constance Aerospace Forum offered a further networking opportunity. The next event is scheduled to take place in May in Wallonia, Belgium. The first TransNetAero certification courses will be offered at the centers of excellence in the second half of the year. These will focus on technology and management, including hot topics such as aerospace and risk management, innovation management, composite materials, and product design.

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Real-time fusion of GEO sensors

Steinbeis integrates sensors into time-critical applications

It seems geo-sensors are everywhere these days. From simple, in-situ micro-sensors and "mobile" sensors (like those in many modern smartphones) to high-resolution, imaging sensors used in aircraft and satellites for remote detection. Rapid developments in data transmission rates are almost making it possible to integrate these sensors immediately into a wide variety of time-critical applications. And this is precisely what experts at the Steinbeis Transfer Center for Applied Geosciences and Environmental Research are now working on.

The types of time-critical applications covered by this work include security at major events, early detection and warning systems for catastrophes, and even agricultural applications like the precise sowing of fertilizers. The big development challenge in this area is how to fuse these different types of sensors – that is, how to combine collected information from very different data sources. The Steinbeis Transfer Center for Applied Geoinformatics and Environmental Studies is working closely with the German Aerospace Center (DLR) in Oberpfaffenhofen in this field of research. In various studies, the DLR is flying over major events while the Steinbeis experts carry out in-situ imaging. The results will be used to develop a Web-based infrastructure for real-time sensor fusion.

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Biological membrane reactors improve water purification

Steinbeis is partner in the EU project BioNexGen

Clean water is the basis for health and the quality of life. The World Health Organization (WHO) believes that water pollution is the single largest threat to our future. Water management and purification are big challenges for research and innovation. Biomembrane reactor (MBR) technology is key to effective sewage treatment and recycling. The Steinbeis-Europa-Zentrum has now partnered up in an EU project devoted to advancing the development of this technology.

MBR technology will be an integral part of sustainable water management for sewage treatment in urban, rural, and industrial areas. The Institute for Applied Research at the Karlsruhe University of Applied Sciences is conducting research as part of collaboration on the EU project BioNexGen. This involves work with European partners to develop membranes with new nano-scale functional layers to be used in water purification. The goal is to develop a new category of membranes that can make use of biomembrane reactors in organic wastewater. Using nanotechnology results in lower contamination levels and a more constant water flow. In addition, researchers expect to achieve a stronger filtering effect with respect to lighter molecular organic dirt particles. Another difference anticipated with the developed biomembrane reactors will be increased durability and lower energy consumption. The work should result in a technology that makes the SME partners more competitive in the European market and countries in the MENA region. The Steinbeis-Europa-Zentrum supported the university with its application for the project, and, as a project partner, it has taken on the tasks of project and knowledge management. This involves handling issues related to intellectual property, the application of research results, and training courses for the project consortium.

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New higher-output measurement of driving dynamics

Steinbeis experts help to develop a gyroscopic system

Driver assistance systems are becoming increasingly important in automotive manufacturing as the safety and comfort offered by modern vehicles increases. Accurately determining all vehicle movements is a must for precise measuring of vehicle driving dynamics. The automotive dynamic motion analyzer (ADMA) is a gyroscopic system that records all motion states of a vehicle with extreme precision. The Steinbeis Innovation Center Embedded Design and Networking has contributed to the development of the new generation of this system.

The first gyroscopic ADMA system was developed specifically for such applications by GeneSys Elektronik over a decade ago. In the new generation – ADMA 3.0 – the data output rate has been increased to 1000 Hz. A total of three Ethernet and five CAN bus interfaces allow for high-speed data transfers. This means data output, configuration, and updates can be carried out via the different Ethernet interfaces. The new development rests primarily on a very fast digital signal processor and a high-performance FPGA (which handles the freely selectable combination of data flows as well as the network management). For the most part, the system was developed and implemented by specialists at the Steinbeis Innovation Center Embedded Design and Networking, in close collaboration with the developers at GeneSys.

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Steinbeis networking forum for SMEs

Platform to merge theory with practice

SME strategy and innovation were the central themes of the second Steinbeis Business Forum, which took place on April 11, 2014. Organized by the Steinbeis Center of Management and Technology (SCMT) in the Haus der Wirtschaft (House of Commerce) in Stuttgart, the event was an opportunity to exchange views, listen to tandem talks, and hear some inspirational speeches.

The day was open to anyone working for an SME, especially Steinbeis clients and partners, but also students and Steinbeis University Berlin graduates. The aim of the day was to provide a communication platform and share new ideas.

The talks at the event, either presented in tandem pairs or simply given to offer some though-provoking ideas, examined the key topics from a variety of angles. The tandem talks involved one Steinbeis expert looking at the principles, immediately followed by a Steinbeis project partner who discussed the same topic from a practical perspective. Afterwards, there was a question and answer session along with a panel discussion involving the audience. The event was moderated by Dr. oec. Patrick Stähler.

Speakers and schedule for the Steinbeis Business Forum

Business model innovations:
Think radically, think new business
Dr. oec. Patrick Stähler

Less is more!
Using time (more) consciously and
enjoying newly acquired uniqueness.
Dr. oec. HSG Urs Frey

Innovations require solutions beyond the "logic of today" –
How can successful innovations be fostered more specifically?
Prof. Dr. Gunther Herr | Christian Kübrich

Family-run business and business succession – The options offered by a foundation as a form of business succession, drawing on the example of Chemotechnik Abstatt GmbH.
Dr. oec. HSG Urs Frey | Andreas Eisenreich

Systematic innovation management:
Theoretical paradoxes and practical approaches
Dr. Lüder Tockenbürger | Thorsten Brecht

For further information go to www.steinbeis-unternehmerforum.de

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New centers in the Steinbeis Network

The Steinbeis Network comprises around 1,000 Steinbeis enterprises spanning all fields of technology and management. Depending on the nature of their work, these may be Transfer Centers, Consulting Centers, Innovation Centers, Research Centers, Transfer Institutes, or separate legal entities. The following new Steinbeis enterprises have been founded since November 2013.

Aachen

Steinbeis Research Center ProMyelo

Prof. Dr. med. habil. Dr. rer. nat. Markus Kipp
E-mail: SU1777@stw.de | Web: www.steinbeis.de/su/1777

"This new center will bridge the gap between neuroscience research at universities and industrial enterprises. Our services cover the planning, organization and running of preclinical studies in the field of multiple sclerosis and stroke research. We also develop new animal and cell culture models that make an essential contribution to the development of new treatment options."

Services

- Planning and running of research projects revolving around neurodegenerative issues, neuroinflammatory issues, or both
- Development of new in vivo animal models in the field of neurobiology
- Consulting on preclinical study projects (neuroscience)
- Support and consulting on submission of applications for third-party funding
- Consulting on the drafting of scientific publications

Bad Liebenzell

Steinbeis Transfer Center APPropos

Prof. Dr. Mario Babilon
E-mail: SU1774@stw.de | Web: www.steinbeis.de/su/1774

"We develop mobile apps that expand the product USPs of our customers. In doing so, IT know-how, user-friendly interfaces, and customer-specific solutions go hand in hand."

Services

- Development of mobile applications
- Implementation of web-based tools for smartphones
- Implementation of server-client structures designed for mobile use
- Development of sensor systems – actuators – interfaces for smartphones

Berlin

Steinbeis Transfer Institute School of Criminal Investigation & Forensic Science. Institute for criminalistic

Dipl.-Kffr. Birgit Galley, CFE
E-mail: SU1784@stw.de | Web: www.steinbeis.de/su/1784

"We are re-establishing criminology as a science in Germany."

Services

- Master's degree in Criminal Investigation (Criminology)
- Specialist conventions on criminology
- Partnerships, research projects, criminology networking

Steinbeis Transfer Institute MOON - Institute for Strategic Marketing

Prof. Dr. Dr. Helmut Schneider, Ingo Webecke
E-mail: SU1785@stw.de | Web: www.steinbeis.de/su/1785

"We see things differently!"

Services

- Consulting
- Training and employee development
- Applied research

Besigheim

Steinbeis Transfer Center Energy Information Technology

Prof. Dr.-Ing. Stephan Rupp
E-mail: SU1766@stw.de | Web: www.steinbeis.de/su/1766

"The growing use of renewable energy is fuelling the modernization of power supply grids. Information and communication technologies are growing in importance. The effectiveness of new concepts can be tested by modeling and the simulation of systems and grids."

Services

- Technical studies
- Network planning and system simulation
- Research projects and prototype development
- Consulting and expert reports

Chemnitz

Steinbeis Research Center Automation in lightweight construction processes (ALP)

Dipl.-Ing. Mirko Spieler, Dr.-Ing. Wolfgang Nendel
E-mail: SU1772@stw.de | Web: www.steinbeis.de/su/1772

Services

- Automation concepts for lightweight construction processes
- Research project coordination
- Contract planning for handling technology and special purpose machinery

Darmstadt

Steinbeis Transfer Center Non-destructive Surface Analysis with the Aid of Raman and Photoelectron Spectroscopy

Prof. Dr. Christian Hess
E-mail: SU1792@stw.de | Web: www.steinbeis.de/su/1792

"The importance of surfaces in technical applications is growing. As a result, surface property requirements are intensifying. The (quantitative) determination of the composition of fields directly related to surfaces plays a central role in this context. We see ourselves as a professional and flexible partner to industrial enterprises on issues relating to surface analysis based on modern spectroscopic methods."

Services

- Consulting
- Analysis
- Research and development
- Expert reports

Frankfurt

Steinbeis Consulting Center rhein.main.international.institute

Prof. Dipl.-Des. Christian K. Pfestorf,
Prof. Dipl.-Des. Michael Richter, MDES
E-mail: SU1782@stw.de | Web: www.steinbeis.de/su/1782

"Design projects are becoming more and more complex and are often initially difficult to fathom in terms of their full scope. To cope with this situation, advanced design tools are being developed and applied to projects (e.g., business design, hybrid design, process design, user experience). This makes it possible to turn design into a solution of business problems."

Services

- Consulting
- Development
- Process assistance
- Implementation

Göppingen

Steinbeis Consulting Center Sales and Marketing Institute (VMI)

Prof. Dr. Rainer Elste, Prof. Dr. Lars Binckebanck
E-mail: SU1786@stw.de | Web: www.steinbeis.de/su/1786

"The problem in Germany is not a lack of ideas or products, but there are deficits in the quality of sales and marketing. We work with you to pinpoint your true potential."

Services

- Business consulting
- Entrepreneur coaching
- Market research (qualitative and quantitative)
- Seminars

Horgau

Steinbeis Consulting Center High-Pressure Waterjet Technology

Prof. Dr.-Ing. Michael Kaufeld, Dr.-Ing. Frank Pude
E-mail: SU1787@stw.de | Web: www.steinbeis.de/su/1787

"High-pressure water jet technology is one of the fastest growing production technologies worldwide. The need for consulting and development services has thus intensified consistently and will continue to grow strongly in the future. Furthermore, special applications such as medical technology will receive more and more attention from suppliers and customers. The new BzHDW allows us to quench the thirst for professional consulting and technology development. Our network offers excellent coverage inside and outside Germany – not just for research organizations involved in this field but also for suppliers of machines, equipment, wear parts, replacement parts, and consumables (e.g., abrasives), which we can put to use with tangible benefit. Ulm University of Applied Sciences offers us an ideal location with the infrastructure to match."

Services

- Consulting
- Technology development and feasibility studies
- Development/testing of components and aggregates
- Continuing professional development (training sessions and certification courses)

Jena

Steinbeis Consulting Center Sales.Training.Strategy

Patrick Brauckmann
E-mail: SU1788@stw.de | Web: www.steinbeis.de/su/1788

"A properly functioning sales department is important to the success of companies!"

Services

- Consulting on sales matters and sales training
- Assistance with the introduction of CRM systems
- Management of sales processes
- Sales controlling
- Development of sales strategies
- Planning and implementation of customer events and trade shows
- Training and continuing professional development in sales divisions
- Trade show training for sales teams
- Sales training for beginners and experts
- Rhetoric and leading negotiations
- Business mediation

Kirchlengern

Steinbeis Research Center Milk Science

Prof. Dr. Volker Krömker
E-mail: SU1783@stw.de | Web: www.steinbeis.de/su/1783

"Only if clinical field trials are carried out on products and services with sustainable benefit can products be created for dairy production. We see ourselves as a professional partner to the industry."

Services

- Research in the fields of milk science and udder health

Krefeld

Steinbeis Transfer Institute Institute for the Construction Industry

Dipl.-Ing. Thomas Murauer
E-mail: SU1773@stw.de | Web: www.steinbeis.de/su/1773

"Only he who creates prospects, will persist in the long term."

Services

- Education and training related to the construction industry
- Certified continuous professional development in the construction sector
- Center for sewage and canalization engineering (ZAK)
- Certified continuous professional development in construction involving existing developments

Oederan

Steinbeis Research Center Conveyor technology/intralogistics

Prof. Dr.-Ing. Klaus Nendel
E-mail: SU1769@stw.de | Web: www.steinbeis.de/su/1769

Services

- Development and design of conveyor technology and its basic elements
- Tribological and mechanical analysis/parameter identification
- Dimensioning of conveyor systems, particularly traction and suspension mechanism
- Materials selection for conveyor systems

Papendorf

Steinbeis Transfer Center Optical Velocity, Length and Particle Measurement Technology

Prof. Nils Damaschke
E-mail: SU1781@stw.de | Web: www.steinbeis.de/su/1781

"Optical velocity as well as length and particle measurement technologies can be used for the contact-free, in-situ characterization of processes. The spectrum of our know-how ranges from straightforward, inexpensive sensors to the design and implementation of highly complex measurement technology used in the 3D real-time characterization of dynamic processes."

Services

- Optical velocity and length measurement technology
  - Laser Doppler measurements (LDA)
  - Measurement using particle image velocimetry (PIV)
  - Classification of velocity fields (up to time-resolved 3D and 3C measurements)
  - Length and surface velocity measurements
  - Flow measurements on ships and propellers (model and full-scale)
- Optical particle measurements
  - Laser-optic measurement of particle size, size distribution and concentration
  - Spray, bubble and cavitation measurements
  - Phase Doppler measurements (PDA)
  - Microorganism concentration measurements in cavitation tunnels and on ships or in the ocean, etc.
- Visual imaging velocity measurements (up to 106 fps)
- Consulting, concept development

Schlier

Steinbeis Transfer Center Technology and Business Management

Dipl.-Ing. (FH) Stephan Rimpl, MBA
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Services

- Business management, interim management
- Business organization
- Project and program management
- Claims and cost management
- Value analysis
- Design to cost
- Production optimization
- Supply chain management

Seoul (South Korea)

Steinbeis Technology & Innovation Centre – Republic of Korea

Giwang Lee
E-mail: SU1791@stw.de | Web: www.steinbeis.de/su/1791

"The Steinbeis Technology & Innovation Center – Republic of Korea (from here on "Steinbeis Korea") is the first Steinbeis enterprise in South Korea. The new Steinbeis center is supported by ED Research, an enterprise with government approval for marketing technology transfer and also a business partner of EEN Korea (Enterprise Europe Network Korean Consortium). The Steinbeis Korea center has over six years of experience in the field of technology transfer and marketing. It offers services relating to the coordination of collaboration between foreign companies and Korean enterprises, such as technology transfer, innovation consulting, and the planning of R&D projects."

Services

- International Technology Transfer
- Tailor-made consulting service to both European companies and Korean companies of providing problem solution in R&D coordination/Marketing/Distribution/Technology Partnering when entering to the opposite market
- Connecting major Korean R&D networks
  - Research Institutes – ETRI(ICT), KETI(Electronics), KATECH(Automotive), etc
  - University – KAIST, GIST, Yonsei University, Korea University, Busan University, etc.
- Education and Training of Innovation strategy development and management

Stralsund

Steinbeis Research Center Engine and Vehicle Development

Prof. Dr.-Ing. Peter Roßmanek
E-mail: SU1771@stw.de | Web: www.steinbeis.de/su/1771

"As international markets become increasing global, premium quality and reliable products form the existential foundation for companies in countries with high wages. To maintain their position in the market, these have to undergo repeated redevelopment. We have extensive experience with the development and analysis of vehicles, vehicle components, and combustion engines, which, as a small and powerful business partner, we gladly provide to medium-sized industrial enterprises operating in fields of automotive/vehicle technology and engine construction/power technology."

Services

- Serial production-related development in the field of vehicle technology and special vehicle construction
- Pulse testing on vehicles and emission analysis
- Applied control engineering and simulation of vehicle systems
- Development of control devices in combustion engines
- Combustion process development for industrial diesel and gas engines
- Thermodynamic testing of mobile heating devices (auxiliary heaters/parking heaters)
- Special machine construction

Stuttgart

Steinbeis Transfer Institute Management Institute for Education, Innovation and Sustainability (MiWIN)

Dipl. Wirt.-Ing. Jörg Waidelich, MBA
E-mail: SU1767@stw.de | Web: www.steinbeis.de/su/1767

"We provide management seminars which integrate practical knowledge transfer in what we call real-time seminars. The companies that participate in our certification programs enjoy immediate and sustainable added value. All of our programs are based on the integrated delivery of training content within the company, in real time, actually during the seminars. This integrated approach with course participants results in long-term skills development and enables people to solve comparable problems independently."

Services

- Certification courses
- Seminars
- International visitor programs

Steinbeis Research Center Simulation

Dipl.-Ing. (FH) Ruben Maier
E-mail: SU1775@stw.de | Web: www.steinbeis.de/su/1775

"A major challenge currently faced by development departments is that many products, processes, and services offer general potential to make savings. But redesigns or detailed evaluations are not commercially viable as the cost of development is higher than the savings potential. This is where the Steinbeis Research Center for Simulation comes in: We provide quick turnaround, concise and ball-park simulations based on Pareto principles, accessing 80% of potential with 20% of the development work."

Services

- Simulation, calculation and optimization (N-Body and FEM)
- Test procedures for simulation verification
- Rapid, short and rough simulation, pre-design simulation
- Mariginal cost-critical simulation

Steinbeis Consulting Center Change Management und Business Coaching

Textilbetriebswirt BTE Doris Deichselberger
E-mail: SU1776@stw.de | Web: www.steinbeis.de/su/1776

Services

- Individual consultations | personal coaching
- Seminars | training | workshops
- Group work | presentations
- Strategy development for companies and staff

Steinbeis Consulting Center Thinking in results

Prof. Dr. Jan Ostarhild
E-mail: SU1780@stw.de | Web: www.steinbeis.de/su/1780

"We provide people with expert support on developing the will to take personal responsibility and bring about transformations to achieve better, tangible, and perceivable results."

Services

- Team and one-on-one coaching
- The complete coaching program spans 12 mentoring sessions
- Mentoring sessions – weekly, every two weeks or on a monthly basis as required
- Mentoring sessions face-to-face or online (webinars)

Steinbeis Transfer Center Development, Manufacturing, and Management

Dipl.-Ing. (FH) Stephan Rimpl, MBA, Dipl.-Ing. (FH) Oliver Brehm, Dipl.-Wirt.-Ing. (FH) Georg Villinger, MBA
E-mail: SU1794@stw.de | Web: www.steinbeis.de/su/1794

"The development and production of industrial goods requires carefully planned and structured management, geared to company goals and market requirements. To do this, the companies need to establish an across-the-board 'development, production, and management philosophy'. Our Steinbeis Enterprise offers the scientific methods required for this and translates this into targeted and pragmatic 'structuring and activity models'. The priority lies in training managers on the development, design, and production of technical products in practical seminars on all areas of technical management. An emphasis is placed on strengthening the ability of technical managers to make things happen in senior management circles, as well as on empowering people to manage their own areas based on goals and results. This is integrated into the demands of the market environment."

Services

- Seminars on business management
- Seminars on structuring and managing design and development (D+D)
- Seminars on specific topics such as management accounting, cost management in D+D, etc.
- Seminars on technical/legal issues such as tolerance management, product liability, etc.
- Market research for issues related to D+D
- Centers of excellence for issues related to D+D
- Business checks related to process chains

Thannhausen

Steinbeis Transfer Institute Medical Innovations and Management

Prof. PD Dr. med. Oliver Meissner, MBA
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"The health care market has developed into a growth driver of the modern economy, fuelled mainly by demographic change, advancements in medical technology, and a better understanding of health issues in the population. We offer continuing professional development solutions based on everyday practice aimed at (specialist) doctors and people working in the field of medical technology. We also help with projects relating to innovation, clinical marketing, and management."

Services

- Continuing professional development for doctors and people working in medical technology fields
- Concept evaluation and innovation management in the field of medical products
- Project management in the fields of medical imaging and medical technology
- Marketing of medical products
- Practice-based research and scientific analysis with a focus on medical imaging and medical technology

Tiefenbach

Steinbeis Transfer Center Structural mechanics

Prof. Dr.-Ing. Bernd Graf
E-mail: SU1770@stw.de | Web: www.steinbeis.de/su/1770

"Vibration and noise reduction is becoming more and more important to the development of machines and vehicles. Simulation and measurement provide a complement to efficient product development and fulfilling the highest requirements."

Services

- Consulting in the field of structural dynamics and life time analysis
- Calculations and measurements
- Training, seminars, and workshops

Villingen-Schwenningen

Steinbeis Transfer Center Personalized Medicine

Prof. Dr. Matthias Kohl, Prof. Dr. Hans-Peter Deigner
E-mail: SU1789@stw.de | Web: www.steinbeis.de/su/1789

"Personalized medicine – the diagnosis and treatment of the future. We help companies and researchers transfer the latest advancements in genome technology, genetics, and metabolomics into the clinical arena and practice."

Services

- Development and validation of biomarkers
- Biostatistical and bioinformatic analyses
- Design and analysis of experiments and clinical studies
- Analysis of big data including graphical processing and interpretation of results
- Training courses in the fields of statistics, statistical software and mathematics
- Functional genomics projects: transcriptomics, metabolomics, genotyping, sequencing
- Approval of medical devices
- Consulting on patent applications


The new Steinbeis House in Ilmenau

The Steinbeis Technology Day in Thuringia

Steinbeis enterprises showcase services in Ilmenau

At the end of last year, two Steinbeis directors working in Ilmenau – Prof. Dr.-Ing. habil. Gerhard Linß and Steffen Lübbecke – welcomed over 70 guests from the world of politics, science, and business to the first Steinbeis Technology Day in Thuringia.

The hosts had two good reasons to celebrate. Apart from the premiere of their specialist convention, they marked the official opening of the second Steinbeis House in Ilmenau and with it, their new company headquarters. The building will provide a new home for the Steinbeis enterprise specialized in quality assurance and image processing, with plenty of room for expansion. The site is directly next to the first Steinbeis House which has already been headquarters for several other Steinbeis enterprises for ten years.

There are currently 20 Steinbeis enterprises operating in Thuringia, four of which showcased their portfolio of services and live business projects at the Technology Day. Dr. Martin Gude, a departmental head at the Thuringia Ministry of Economics, congratulated Steinbeis for its success in Ilmenau. In his opening speech, he highlighted the need for business and science to work together more closely than in the past – the success of transfer as practiced by Steinbeis enterprises has been exemplary. Prof. Dr. Michael Auer, Chairman of the Steinbeis Foundation Board, outlined the key success criteria of Steinbeis transfer, emphasizing the significance of Steinbeis operations in Thuringia. Steinbeis has been working in the region since 1991 and is involved in successful collaborations with universities and local research institutions.

An exhibition organized by Steinbeis enterprises to coincide with the event gave visitors a hands-on chance to learn more about actual transfer projects and their results. There was also an opportunity to exchange notes and discuss common experiences over lunch – a successful culmination to a successful day.

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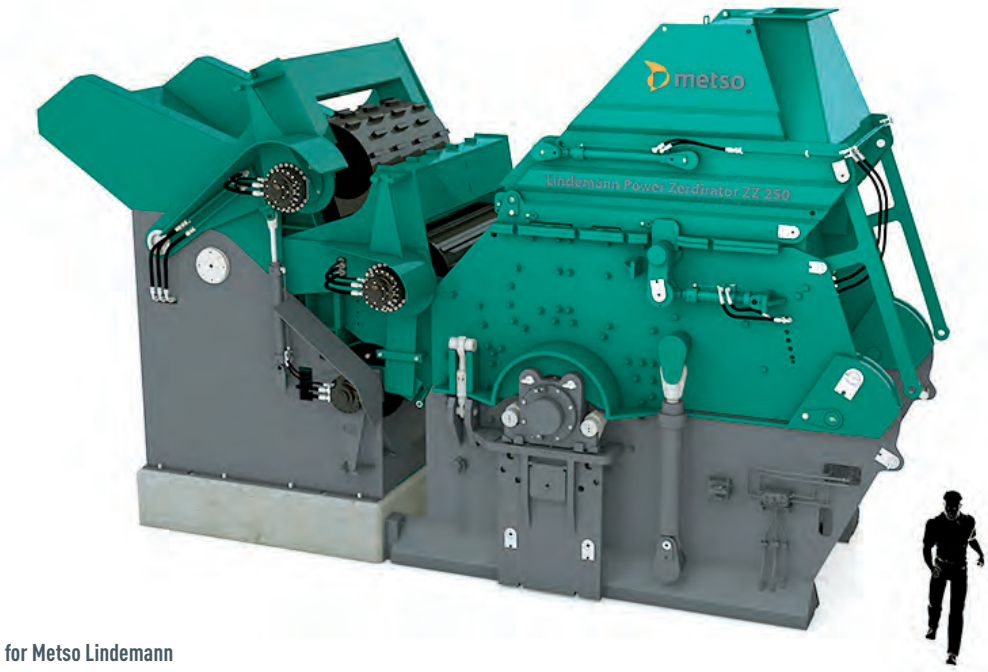

The new shredder for Metso Lindemann

Steinbeis development wins iF product design award

i/i/d is awarded for the new scrap shear and shredder generation of Metso Lindemann

Scrap metal may go on the scrap pile, but it hasn't been waste for a long time. Scrap is a raw material used in a variety of recycling processes throughout the world to make steel. Metso Lindemann is one of the world's leading producers of recycling units. In 2011, it called in the Steinbeis Transfer Center i/i/d (Institute for Integrated Design) to totally rethink and redesign their colossal scrap shears and shredders. The project earned the i/i/d the coveted international iF product design award from the Hanover-based service provider Industrial Forum Design.

The aim of the collaborative project was to develop an integrated and creative overarching concept for a uniform, progressive product hierarchy and design that not only creates an identity, but also optimizes all processes and gains high recognition. "The new machines convey a sense of robustness, durability, and longevity. They set themselves apart with a uniquely smooth surface that prevents dirt and dust buildup – almost unheard of for machines of this size. The build of the machines and the functions are finally visually comprehensible, thanks to a formal rundown of components that belong together," explains Prof. Detlef Rahe, director of the i/i/d.

As well as optimizing all essential processes, the new generation of machines also enhances energy efficiency and reduces overall costs. Assembly, construction, maintenance, and cleaning are now all much simpler and the underlying concept is a good match with market, customer and user requirements. The operating principles are applicable worldwide and based on an innovative system that overcomes international language and qualification hurdles, makes controls safer, and helps monitor complex processes. Finally, improvements have also been made to specific tasks and operations in terms of safety, handling and work processes.

"Transferring the new product and operating concepts to all other machines and plants will gradually bring us closer to our long-term aim of achieving an individual, uniform corporate industrial design combined with ultimate functionality and efficiency, strong recognition, and user-friendly configuration, thus galvanizing Metso Lindemann's position in the market," explains August van der Beek, the long-standing head of engineering at Lindemann.

The redeveloped control interface

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About the author
Prof. Dr. Marco Wölfle is scientific director of the Steinbeis Transfer Institute Statistics and Political Economy, the Center for Real Estate Studies and the Business and Public Administration Center (Wirtschafts- und Verwaltungswissenschaftliches Zentrum), where he is the incumbent of the junior professorship for Financial and Real Estate Markets. He was previously Rector of the International University of Cooperative Education in Freiburg. Wölfle studied at a graduate and PhD level at the University of Freiburg, where he was awarded the Constantin von Dietze Prize for his contributions as part of his thesis on "The Role of Information in Financial Markets".

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Dr. Julia Schlicht worked as a research assistant at the SVI Endowed Chair for Marketing and Direct Marketing at Steinbeis University Berlin between 2009 and 2012. She completed her PhD in 2013.

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Associate professor Dr. habil. Gernot Barth has been working as a mediator and trainer of mediators since the foundation of IKOME® (the Institute of Communication and Mediation), the Steinbeis Consulting Center Mediation of Business, and the Academy for Social Aspects and Law (Steinbeis Transfer Institute at Steinbeis University Berlin). A qualified attorney and master of mediation, Bernhard Böhm is co-director alongside Dr. Gernot Barth of the Steinbeis Consulting Center for Corporate Mediation as well as the state-approved office of the Steinbeis Consulting Centers company (Steinbeis Beratungszentren GmbH). He also shares responsibility for a variety of domestic and European mediation projects involving cross-border mediation.

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About the author

Prof. Dr. Helmut Beckmann is a professor of e-business systems for the Electronic Business degree (now renamed Wirtschaftsinformatik in German) at Heilbronn University. He also heads up the Electronic Business Steinbeis Consulting Center (SBZ-EB). The ERP Study is the first publication in a series of papers on business IT by Prof. Dr. Helmut Beckmann. Thomas Schäffer completed his information systems degree in 1999 at the University of Stuttgart and has since worked at the Electronic Business Steinbeis Consulting Center (SBZ-EB). As part of his thesis, he conducted research in the field of core data and data quality management.

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Prof. Dr. Werner G. Faix is Managing Director of the School of International Business and Entrepreneurship (SIBE) at Steinbeis University Berlin. Stefanie Kisgen, MBA, has a diploma in regional studies and is Deputy Managing Director of SIBE. Simone Heilmann was also involved in the research project during her master's degree.

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About the author

Karlheinz Meier studied at Steinbeis Business Academy (SBA) where he looked at the market for mobile end device applications as part of a degree study.

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