

# Applied Research Institutions in Baden-Württemberg


A guide to non-university research institutions  
and their research and cooperation services



Baden-Württemberg

WIRTSCHAFTSMINISTERIUM


# Foreword

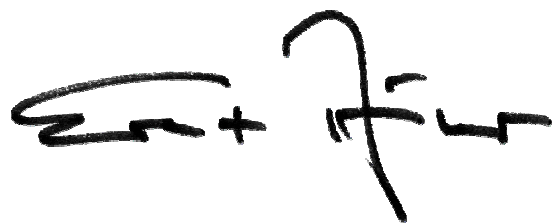
 Research and technological development are indispensable aspects of any innovative corporate strategy. The spreading international sharing of labour, the globalization of markets and the keener competitive situation will increasingly force enterprises to orientate both their products and their manufacturing processes toward Hi-Tech. This applies particularly to Baden-Württemberg - a state with an economy characterized by an above-average proportion of capital goods and producing industries. In addition to this, the EU-Expansion has led to a re-orientation amongst the European competitors, with new opportunities as well as risks for enterprises.

The growing complexity of modern technology also requires closer cooperation between the economy and science. The Ministry of Economic Affairs considers its primary task in the politics of technology, to be the support of these joint efforts of industry and science in their search for practical innovative solutions. A highly diversified technological infrastructure must offer enterprises competent partners in fields where they need practical scientific assistance from outside to complement their own development efforts. A dense network of technology transfer centres rounds off the range of research and technology services and facilitates access to scientific resources for enterprises. The range of technology and its transfer in an integrated system are thus advantages offered to enterprises by the location.

Industry-orientated research facilities in Baden-Württemberg should be and want to be the partners of industry. The range they offer and the work they do are essentially based on requirements and needs of the industry. With this brochure the Ministry of Economic Affairs intends to provide compact information about applied research institutions, as well as enabling the access to these institutions for businesses, thereby contributing to cooperative relationships and the intense formation of competence networks



Profiles of each institute give an insight over the economy-related research facilities, in order to clarify the technological infrastructure. The brochure relays important information to interested users and businesses about fields of research, equipment, addresses, and the contact personell of each institute. 



Ernst Pfister Mdl

Minister of Economic Affairs of the State of Baden-Württemberg

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# Applied Research in the Service of Baden-Württemberg's Industry

Baden-Württemberg - a region with no raw materials worth mentioning, has been characterized since the onset of general industrialization by the determination of its inventors and founders, its handmen und artisans, its businessmen and their vital urge "to get on with" the business of processing raw materials and manufacturing high-quality products. Particular significant in this respect was the work of Ferdinand von Steinbeis and Prof. Meidinger, who 150 years ago already understood that to promote trade and industry also requires advancement of technology.

The economy of our state today is exemplary for many other regions - and is closely linked with the international sharing of labour. Products and production methods of a high technological standard and quality have provided a sound foundation for the amazing export achievements of companies in Baden-Württemberg.

This leading role in the international contest for competitiveness and efficiency can however only be maintained if the future also continues to guarantee the rapid transfer of new technologies into rational production methods and sellable products.

Applied research as pursued in institutions and organizations in Baden-Württemberg has played a major role in the economic development of the state, acting as a bridge between:

- basic research as pursued for example by Universities and Max Planck institutes; and
- the technical development of new products and production methods in industrial companies.

Large-sized businesses and companies pursue their own comprehensive research programs with their own institutions and specialists. On the other hand, small- and medium-sized companies often have neither the special staff and facilities required nor, above all the financial means to pursue their own research.

The state government of Baden-Württemberg has always promoted applied research to the benefit of the state's economy which is characterized by a broad range of medium-sized business and companies, acknowledging its special significance in technological policies. This can also be seen in the in the funds granted by the state for institutional research, and grants for research projects, amounting to over 71 million Euros in 2006.

The success of this consistently implemented, longterm technology policy can be seen today in the wide range of efficient institutions and organizations for applied research in Baden-Württemberg:

- 14 institutes of the Fraunhofer Society,
- 2 national research centres of the Helmholtz Association,
- 14 contract research institutes,
- the Steinbeis Foundation for Economic Promotion with its more than 400 transfer institutions, located mostly within the universities and colleges of the state.

In addition to this there is an office for a Fraunhofer Society Institute not located in Baden-Württemberg.

Baden-Württemberg's industry makes intensive use of these institutions. And the state's economic forces are increasingly involved not only in playing supportive roles but also in the initial foundation phases of new organizations: this is just more evidence of an technology policy which has been successfully based on the demand of private industry, and which maintains close contact between the sciences, the economy and the state.

The state government of Baden-Württemberg places particular emphasis on this dialogue because this is really the only means of updating and expanding applied research.

# Contract Research Institutes

The contract research institutes open up for the industry relevant fields of technology, such as microelectronics, microsystem technology, technical textiles, biotechnology, information technology or renewable energies, and transfer their know-how to the industry through contract research. Among these institutes are also special industry-related researches institutes, often hosted by nation-wide organisation united in the AIF, a cooperation of industrial research associations.

These institutes are not state-run, but independent institutes in the legal form of civil law foundations and associations. As far as they are industry-related they are hosted and supported by research associations of the industry and by federations.

The contract research institutes have developed unique attributes and elaborated clear core competences. They play a major role in the developing of new technologies being relevant for the industry. They contribute to a considerable acceleration of the knowledge transfer from the basic research of the universities to the enterprises. In the field of information technology, for instance, the period of knowledge transfer has been reduced from five to 1 or 2 years.

These institutes are important partners, particularly for small and medium-sized companies, in the field of technology transfer. Particularly the processing of research contracts from the industry is part of their task, but also the research work in joint research projects which are funded by state, federal or European grants. The range of offers of the institutes also includes expert advice and offers for further education and trainings. The more industry-related institutes also offer scientific tests and analyses.

The directors of most institutes simultaneously hold a chair, respectively head a university institute. An intensive exchange of knowledge and personnel between research institutes and universities is therefore guaranteed.

At present, 12 of these contract research institutes are being supported solely by the Land Baden-Württemberg. In 2006 the budget of these institutes covered more than 79 million Euros (without supplementary investments). Over 2000 projects were carried out in commission or in cooperation with the industry; earnings from the industry amounted to over 29 million Euros.

# Institutes of the Fraunhofer-Society

In Germany the Fraunhofer Society is considered to be the leading organization for applied research, particularly in fields of technology which are of special significance to industry.

The society has 80 research and service organizations nationwide, 58 of these are research institutes, with the emphasis on fields of natural sciences and engineering.

Our state has a long tradition of supporting the Fraunhofer Society, and so more than 25 % of the total research potential of the society is located in Baden-Württemberg. Around 3 400 are employed here in fields such as

- bioengineering,
- building engineering,
- information technology,
- materials science,
- power engineering,
- production automation,
- sensor technology.

The basic financing of the Fraunhofer Society is shared by the nation as a whole and the states where institutes are located in the ratio 90:10, in accordance with the overall agreement on promoting research. The budget of the institutes in Baden-Württemberg amounted to 251 million Euros for 2006. Nearly 1 850 projects with earnings of 74 million Euros were commissioned by the industry.

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# National Centres of the Helmholtz Association

With its 15 research centres, amounting to 25 700 employees, and an annual budget of approx. 2.3 billion Euros the Helmholtz Association of National Research Centres (HGF) is Germany's largest scientific research institution. The association predominantly pursues long-term research objectives of the state in scientific autonomy.

In cooperation with industry and with clients from the public sector, these establishments open up important future potential through the development of new technologies, thereby making a major contribution to maintaining the competitive strength of the German economy in the international arena.

Typical examples of industrial cooperation are:

- Licence- and know-how contracts,
- Commissioned research and development,
- Scientific laboratory and other services,
- Transfer and exchange of personnel for specific projects,
- Cooperation and joint research projects.

Specific know-how and spin-off developments emerging from the large-scale projects are of special interest to small- and medium-sized companies.

In Baden-Württemberg there are two technical Helmholtz-Centres:

- the Deutsches Zentrum für Luft- und Raumfahrt (DLR) (German Aerospace Research Center), with the main focus on energy and traffic in Stuttgart, and the reasearch activities on space propulsion in Lampoldshausen;
- the Forschungszentrum Karlsruhe in der Helmholtz-Gemeinschaft, acting in the fields environmental research and technology, energy, microsystems and nano technology.

The national centres of Helmholtz Association are funded jointly by the nation and the states where the institutes are located, at a ratio of 90:10, in accordance with the general agreement on promoting research, as in the case of the Fraunhofer Society.

The two Helmholtz-centres in Baden-Württemberg employ more than 4 400 staff. The budget reached a volume of more than 480 milion Euros in 2006. More than 510 projects were carried out in commission with industry, achieving earnings of over 34 million Euros.

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# Steinbeis Foundation for Economic Development

In 1971 the Steinbeis Foundation for Economic Development was founded as a private law institution. The foundation's main objective is helping the medium-sized industry in Baden-Württemberg to cope with the increasing international economic challenges.

As a decentralised organisation with its base in Stuttgart, the Steinbeis-Foundation fulfills its tasks all over the country. Over 400 Transfer-Centres, mostly situated in the vicinity of Universities and colleges, act in the interests of the Baden-Württemberg economy; there are over 720 Steinbeis establishments worldwide.

Over 5 100 staff members (amongst them about 800 Professors) of all trade skills accomplish the essential work of technology transfer. The spectrum of services ranges from information to the state-of-the-art

technology, problem analyses, working out technology-an market overviews, Project management, up to the realisation of development contracts. Consultations for small and medium sized companies is free of charge, experts from the Steinbeis Centers support the access to new technologies and sources of knowledge. The allround consultations cover aspects from organisational and marketing themes up to product and process information.

The turn-over in 2006 reached almost 110 million Euros with more than 14 000 projects for the complete Steinbeis Organisation.

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# Register of Institutes

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▪ Forschungsinstitut Edelmetalle & Metallchemie (fem)	11
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▪ Forschungszentrum Informatik (FZI) an der Universität Karlsruhe	13
▪ Hahn-Schickard-Gesellschaft Institut für Mikroaufbautechnik (IMAT)	14
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▪ Institut für Lasertechnologien in der Medizin und Meßtechnik (ILM) an der Universität Ulm	16
▪ Institut für Mikroelektronik Stuttgart (IMS)	17
▪ Institut für Textilchemie und Chemiefasern (ITCF) der Deutschen Institute für Textil- und Faserforschung Denkendorf (DITF)	18
▪ Institut für Textil- und Verfahrenstechnik (ITV) der DITF	19
▪ Zentrum für Management Research (DITF/MR) der DITF	20
▪ Lederinstitut Gerberschule Reutlingen e.V. (LGR)	21
▪ NMI Naturwissenschaftliches und Medizinisches Institut an der Universität Tübingen	22
▪ Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW)	23

## **Institutes of the Fraunhofer Society**

▪ Fraunhofer Institute for Applied Solid-State Physics IAF	24
▪ Fraunhofer Institute for Industrial Engineering IAO	25
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▪ Fraunhofer Institute for Information and Data Processing IITB	29
▪ Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut EMI	30
▪ Fraunhofer Institute for Physical Measurement Techniques IPM	31
▪ Fraunhofer Institute for Manufacturing Engineering and Automation IPA	32
▪ Fraunhofer-Institut für Silicatforschung ISC -Außenstelle Bronnbach-	33
▪ Fraunhofer Institute for Solar Energy Systems ISE	34
▪ Fraunhofer Institute for Systems and Innovation Research ISI	35
▪ Fraunhofer Institute for Mechanics of Materials IWM	36
▪ Fraunhofer Information Centre for Planning and Building IRB	37
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## **National Research Centres of the Helmholtz Association**

▪ Deutsches Zentrum für Luft- und Raumfahrt (DLR)	39
▪ Forschungszentrum Karlsruhe in der Helmholtz-Gemeinschaft (FZK)	42

## **Steinbeis Foundation for Economic Development (StW)**

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# Bekleidungsphysiologisches Institut Hohenstein e.V. (BPI)

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74357 Bönningheim, Germany  
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Internet: [www.hohenstein.de](http://www.hohenstein.de)

**Director:**  
Dr. Stefan Mecheels

**Contact for inquiries:**  
Dr. Stefan Mecheels, Phone: +49 7143 271-110  
or the heads of department named below

## RESEARCH AREAS

### Clothing Physiology

*(Prof. Dr. Karl-Heinz Umbach, Phone: +49 7143 271-66):*

Quantitative measurement and assessment of the wear comfort of textiles and clothing; determination of the physiological strain on the individual depending on clothing, climate and activity; development of guidelines for the construction of physiologically optimised textiles and clothing systems.

### Clothing Technology

*(Dipl.-Ing. (FH) Martin Rupp, Phone: +49 7143 271-117):*

Sizing surveys; international size systems; patterning (2D/3D), industrial made-to-measure clothing; virtual product development, virtual try-on; smart clothes, intelligent clothing.

### Laundry / Textile Leasing / Drycleaning

*(Dr. Stefan Mecheels, Phone: +49 7143 271-110 / Petra Klein, Phone: +49 7143 271-716):*

Washing ecology; textile hygiene; textile analysis / limits of utilisability (minimum requirements, care properties) / cleaning technology; solvents ecology; environmental analysis.

### Textile Innovations

*(Dr. Jan Beringer, Phone: +49 7143 271-714):*

Innovative procedures for textile finishing (nanotechnology, functional surface etc.); development of technical textiles (textiles for construction); UV protective textiles.

### Medical Textiles

*(Dr. med. habil. Dirk Höfer, Phone: +49 7143 271-432):*

Innovative barrier textiles; textile dressings; application of active substances via fibres; skin compatibility; biofunctional textiles; antimicrobial textiles.

### Global Strategies

*(Prof. Dr. h.c. Josef Kurz, Phone: +49 7143 271-503):*

Innovative strategies for all aspects of the textile industry with national and international orientation, focussing on the areas of intelligent textiles; wearable computers; communicative bio-medical clothes; virtual technologies.

## FACILITIES

- Technical equipment for textile finishing, scanning electron microscope (SEM), atomic force microscope (AFM), laboratory for colour, UV and UV/VIS measurement, measuring equipment for colour matching, pollution analysis laboratory;
- Complete equipment consisting of testing devices and apparatus for quantitative clothing physiological measurements, i.e. thermoregulatory models of human skin und human being, car driving simulator for thermo-physiological test of car seats, measuring device for thermophysiological tests of upholstery;
- CAD systems for computerized pattern design and grading of clothing, body scanner technologies;
- Dry cleaning and laundry machinery, CO<sub>2</sub> cleaning technology laboratory, textile technological and analytical laboratory for textile and detergent testing;
- Cell and molecular biology laboratories for medical textiles incl. clean room facility, fluorescence microscopic equipments and microplate detection system, incl. bioluminescence;
- Microbiological laboratory, endotoxin laboratory, equipment for particle measurement in the air as well as measurement of particle release from textiles.

## TARGET GROUPS

- Textile, garment and fiber industry, trade, industrial laundry, textile dry cleaning, hospitals, old age people's homes, nursing homes, textile leasing;
- Medical engineering industry, construction industry, automobile manufacturers, detergent industry, chemical industry;
- Suppliers of the textile, garment and textile care industry.

# Forschungsinstitut Edelmetalle & Metallchemie (fem)

Katharinenstraße 17  
73525 Schwäbisch Gmünd, Germany  
Phone: +49 7171 1006-0  
Fax: +49 7171 1006-54  
E-Mail: fem@fem-online.de  
Internet: www.fem-online.de

**Director:**  
Dr.-Ing. A. Zielonka

**Contact for inquiries:**  
Dr.-Ing. A. Zielonka

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## RESEARCH AREAS

### Physical Metallurgy

*(Dr. Ulrich Klotz, +49 7171 1006-46)*

Development of precious metals alloys (esp. jewellery and dental alloys); melting, casting, mechanical working, annealing; metallographic investigations (microstructure, coating thickness, coating hardness); materials testing (tensile/compression tests, hardness etc.); optical microscopy, quantitative image analysis; SEM with EDX; failure analyses.

### Electrochemistry - Electroplating - Corrosion

*(Dr. Renate Freudenberger, +49 7171 1006-23)*

Deposition and testing of electrochemical coatings; development of deposition processes and coating systems; development of measurement methods and testing procedures; modeling and simulation of electrochemical cells and processes; corrosion and corrosion prevention; quality control of coated parts; failure analyses.

### Light Metals - Anodisation - Lacquering

*(Dipl.-Ing. (FH) Judith Pietschmann, +49 7171 1006-35)*

Surface protection of light metals (esp. aluminium, magnesium); anodisation and organic coatings; optimizing of pretreatment and cleaning processes; modification of applied processes and new developments; testing of corrosion resistance, UV- and weather proof; determination of coating properties (thickness, adhesion, wear, gloss, color, roughness, hardness, bending capacity and elasticity); independent expertises and failure analyses; testing of coating systems according the guidelines of Quality Assurance Associations.

### Plasma Surface Technology - Materials Physics

*(Dr. Martin Fenker, +49 7171 1006-49)*

PVD- and PACVD-deposition (magnetron sputtering, cathodic arc and electron beam evaporation, ion beam deposition, pulsed CVD, etc.); development of wear and corrosion resistant coatings, solid lubricant coatings, decorative coatings, hybrid coatings (electroplating + PVD); characterization and testing of coated materials; x-ray diffraction; determination of electrical and magnetic properties.

### Analysis - Environmental Analysis

*(Dr. Martin Völker, +49 7171 1006-45)*

Analyses of materials (esp. metals/precious metals and their alloys, steel, metallic coatings); analyses of process solutions, electrolytes and pickling solutions; fire assay; testing of drinking water, ground water, waste water and residues; process development and quality control; consulting and expertises.

## OBJECTS OF INTEREST

- Scientific and industrial R&D in the fields of surface technology and metals science.
- Services: Technical examinations, analyses, environmental analyses, consulting and expertises (Accredited testing laboratory according to DIN EN ISO/IEC 17025 for nearly 200 testing procedures).

## FACILITIES

- Modern measuring and testing equipment for electrochemical and metallurgical investigations, chemical and physical analyses.
- Equipment for the deposition, characterization and testing of coatings, thin films and surfaces (electrochemistry, anodisation, lacquering, vapor deposition).

## TARGET GROUPS

Industry, trade and handicraft, scientific institutions, public authorities and institutions.

# Forschungsinstitut für Pigmente und Lacke e.V. (FPL)

Allmandring 37  
70569 Stuttgart, Germany  
Phone: +49 711 68780-0  
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E-Mail: [fpl@fpl.uni-stuttgart.de](mailto:fpl@fpl.uni-stuttgart.de)  
Internet: [www.fpl.uni-stuttgart.de](http://www.fpl.uni-stuttgart.de)

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Dr. W. Philipp Öchsner (General Manager)

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Prof. Dr. C. D. Eisenbach  
Dr. W. Ph. Öchsner

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## RESEARCH AREAS

### Applied research in the fields of

- Pigments, paint resins and coatings materials; coatings application technology, corrosion protection;
- Coatings analysis and materials testing;
- Macromolecular chemistry and polymer science.

### Current research projects:

- Pigments: Organic modification of pigments and particle surfaces for easier dispersion and improved stabilization; LCST and USCT technology;
- Binders: Structure-properties relationships (including UV-curing, waterborne and powder coatings);
- Coatings Materials: Characterization of the drying and curing process; Layered silica pigments and composite coatings;
- Nanoparticle reinforced clear coats;
- Adhesion mechanisms of multilayer coatings;
- Improvement of the adhesion of UV cured coatings and printing on plastic substrates and metals;
- Investigation of the scratch resistance and polishing of automotive parquet and furniture coatings; correlation with molecular structures;
- Corrosion protection of steel and non-ferrous metals;
- Electrochemical testing of coatings on metals;
- Weather stability, aging and fouling behavior of coatings;
- Photocatalytically active coatings: Testing and formulation requirements; air cleaning and soil;
- Laser marking of coatings and plastics; switchable optical properties.

### Service in the field of the analytical and applied material testing of coatings, plastics and raw materials

- Characterization of Pigments;
- Special Tests of Coating Materials and Coatings;
- Mechanical Resistance of Organic Coatings;
- Thermal Analysis Processes;
- Microscopic Analysis of Pigments, Coatings and Substrates (e.g. REM-EDX, AFM);
- Spectral and Chromatographic Analyses;
- Long-term Resistance and Corrosion Protection of Coatings.

## FACILITIES

- Various paint, chemical, physical and electrotechnical laboratories and workshop;
- Application of coatings and evaluation including UV-, weathering and corrosion testing;
- Pigment characterization (ESA - electrokinetic sonic amplitude, QELLS - quasielastic laser light scattering, Sedigraph);
- Chromatographic (GC, TLC, HPLC, GPC), spectroscopic (FTIR, IR-ATR, NIR, UV/VIS, AAS, ICP) instrumentation; mechanical, dynamic mechanical analysis (DMA, DSC, TGA); scratch and stone impact test; differential calorimetry and TGA;
- Electrochemical methods including scanning reference & vibrating electrode technique (SRET & SVET), electrochemical impedance spectroscopy (EIS & LEIS), electrochemical noise analysis (ENA), local ion concentration technique (LICT);
- Transmission and scanning electron microscopy (TEM and REM with EDX), Atomic force microscopy (AFM);
- Photocatalytical activity of pigments and coatings.

## TARGET GROUPS

Companies representing producers of raw materials for pigments and coatings, manufacturers of pigments and coatings as well as painters and decorators.

# Forschungszentrum Informatik (FZI) an der Universität Karlsruhe (TH)

Haid-und-Neu-Straße 10-14  
76131 Karlsruhe  
Phone: +49 721 9654-911  
Fax: +49 721 9654-909  
Internet: www.fzi.de

## Director:

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Prof. Dr. Rudi Studer

## Contact for inquiries:

Gabi Bütner, Phone: +49 721 9654-911

## MAIN FIELDS OF ACTIVITIES

FZI transforms for its clients the latest results from informatics, economics, and engineering into innovative solutions. In projects that are carried out with its customers, organizational as well as software and systems solutions are developed that result into new or improved products, services and business processes. FZI cooperates with small and medium enterprises and with large companies and public institutions.

### Business segments:

Automotive, traffic and production; eHealth; information services and software.

### SOFTWARE ENGINEERING (SE)

The research department Software Engineering (SE) develops and evaluates engineering methods, tools and software processes for the efficient construction and evolution of complex software systems and introduces them into enterprises. The competencies of the department comprise model-driven component-oriented software construction, software quality, software re-engineering, Java in safety-critical embedded systems, analysis, modelling and improvement of business processes and software processes. Moreover the department runs the "Zentrum für Softwarekonzepte" (Centre for Software Concepts) in cooperation with Microsoft.

### INFORMATION PROCESS ENGINEERING (IPE)

The research department Information Process Engineering (IPE) establishes intelligent information logistics within intra- and interenterprise business processes. The interdisciplinary department uses methods of informatics and economics for the analysis and evaluation as well as for the design and optimization of intelligent data processing throughout the whole information life cycle. IPE uses semantic and context-aware methods for creating, locating, storing, distributing and transferring information such that all information that is available is efficiently used as a productive resource or value-creating product.

### EMBEDDED SYSTEMS AND SENSORS ENGINEERING (ESS)

The research department Embedded Systems & Sensors Engineering (ESS) is active in the development and evaluation of integrated methods and tools for the specification of hardware/software systems and microsystems in the area of automotive, plant automation, and medical technology. Other areas of activities are computer-supported administration of functional and non-functional specification data as well as system simulation. In the field of medical engineering main emphasis is placed on the development of mobile sensors, which can be integrated smoothly in the patient's environment. ESS also coordinates the FZI activities in Health Care.

### INTELLIGENT SYSTEMS AND PRODUCTION ENGINEERING (ISPE)

Intelligent Systems and Production Engineering (ISPE) develops and evaluates engineering methods, tools and design processes for the realisation of software controlled technical systems. The research department supports its partners in promptly introducing latest research results and innovations into their value chain in the areas of robotics and automation of service and diagnosis applications, in the field of microelectronic design or in the area of product lifecycle management.

## TARGET GROUPS

- IT users, who are interested in an improvement of their information logistics and business processes.
- Suppliers of IT products, that want to further develop their products, based on process-oriented development methods systems and interoperability of systems.
- Vendors of embedded systems and technical products that aim at realising automation solutions of high quality or innovative approaches in product life cycle management.

# Hahn-Schickard-Gesellschaft Institut für Mikroaufbautechnik (HSG-IMAT)

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Internet: www.hsg-imat.de

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Prof. Dr. rer. nat. Heinz Kück

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## RESEARCH AREAS

- **Packaging Technology for Micro Devices**  
Miniaturized plastic packages and Moulded Interconnect Devices (MID);  
SMD and Chip Assembly (soldering, adhesive bonding, wire bonding, Flip Chip, Glob Top).
- **MID Based Miniaturized Sensors und Actuators**  
Accelerometers, inclination sensors, Angular position sensor, valves.
- **Fabrication of Polymer Devices**  
Micro injection moulding, Two shot injection moulding, Mould making;  
Selective metallization of polymer devices (LCP and plastics suitable for LDS);  
Joining of polymer devices.
- **Precision Machining**  
High Speed Cutting, Micro electro discharge machining;  
Electrochemical milling using ultra short voltage pulses.
- **Metrology and Testing of Micro Devices**  
Metrology;  
Performance testing, Environmental and reliability testing.
- 3D laser system: LPKF-UV, 355 nm and LPKF-IR, 1064 nm;
- Direct Structuring M<sup>3</sup>D: Optomec;
- Selective electroless plating of plastics, e.g. LCP and plastics suitable for LDS; Sputtering system: Leybold-Heraeus Z 400, 3" targets;
- SMD pick and place system: Fritsch Place All PA 908.580; Flipchip bonder: Finetech Fineplacer 145;
- Dispensing system: I&J Fisnar 500 LN;
- Vapour phase reflow furnace: IBL SLC-500;
- Automatic ultrasonic wire bonder: Hesse & Knipps Bond Jet 710; Semi automatic gold wire bonder: F&K Delvotek 5610; Semi automatic bond and shear tester: Dage Series 4000;
- Hot embossing tool: Schmidt ServoPress 420 LV;
- Scanning electron microscope: EOL TESCAN 5130 with EDX Analysis: Oxford Instruments INCA-System 200;
- Differential Scanning Calorimetry (DSC): Netzsch DSC 204 Phoenix; FT-IR spectrometer: Bruker Vector 22 with ATR Device; TMA: Netzsch TMA 202; UV/VIS-Spectral photometer: Thermo Spectronic Genesys 6;
- 3-D profiler: ATOS Surfascan 3CS; 3-D coordinate measuring machine: Werth VideoCheck-IP 400x400x200; Optical Profilometer with AFM: FRT Microglider;
- Microhardness tester: Fischer Fischerscope H 100; X-Ray fluorescence spectrometer: Fischerscope XDVM-μ;
- Thermal shock chamber: CTS TSS-70/130; Temperature and humidity chamber: CTS CV-70/350;
- Mechanical shock and vibration tester (Shaker): LDS V780/HPA-K.

## TECHNICAL EQUIPMENT

- Design/simulation software: Pro/ENGINEER, AutoCAD, EAGLE, Moldflow, Sigmasoft, ANSYS, PSpice, Testpoint.
- High Speed Cutting: Fehlmann Picomax 60M, 5 axes and Primacon PFM 24, 3 axes;
- Ultra Precision Cutting Machine: Precitech Freeform 700A
- Micro electro discharge machining: Sarix SR-VHPM; electrochemical milling by ultra short voltage pulses: ECMTEC Micro;
- Two shot injection molding: Arburg 320S 500 - 60/60; Micro injection molding: Battenfeld Microsystem 50;

## TARGET GROUPS

Companies in the following branches: automotive, automation, bio and medical technology, information and communication technology.

# Hahn-Schickard-Gesellschaft Institut für Mikro- und Informationstechnik (HSG-IMIT)

Wilhelm-Schickard-Straße 10  
78052 VS-Villingen, Germany  
Phone: +49 7721 943-0  
Fax: +49 7721 943-210  
Internet: www.hsg-imit.de

**Director:**  
Prof. Dr. Holger Reinecke (Spokesman)  
Prof. Dr. Yiannos Manoli  
Prof. Dr. Roland Zengerle

**Contact for inquiries:**  
Moritz Faller, Phone +49 7721 943-221

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## RESEARCH AREAS

HSG-IMIT is a leading R&D provider for Microsystems Technology. In the fields of microfluidics, sensors and information technologies. Products for medical technologies, biotechnologies, analytics, pneumatics and the automotive sector have been brought to the market. The service offer ranges from feasibility studies, prototyping to serial production. HSG-IMIT's service philosophy is: From idea to production – you will receive service from one hand. The competencies are organized into product groups. HSG-IMIT is closely linked to the Chair for MEMS-Applications which is part of IMTEK (University of Freiburg).

HSG-IMIT is one of the first institutions dedicated to industrial research which is certified after the new process oriented management system ISO 9001:2000.

### Range of Services:

#### R&D SERVICES

- Sensors & Systems
  - Inertial Sensors
  - Thermal Sensors
- Microfluidics
  - Lab-on-a-Chip
  - Microdosage Systems
- Mikro Medical Technology
- Energy Autonomous Systems

#### PROTOTYPING & PRODUCTION

- Waferprocessing
- Flexible Microsystems
- Assembly & Packaging

#### ENGINEERING SERVICES

- Modelling & Design
- Failure Analysis
- Measurement Automation
- Electronic Systems

## FACILITIES

- Tools for layout and simulation (CAD, FEM) as well as data acquisition;
- Clean room laboratory (about 600 m<sup>2</sup>, class 10-1000) with complete microfabrication technology;
- Metrology for characterization of mechanical and electrical properties as well as surfaces (a.o. REM).

## TARGET GROUPS

Companies in the field of automotive, electronic, precision mechanical, domestic, climatic, medical and environmental applications.

# Institut für Lasertechnologien in der Medizin und Meßtechnik (ILM) an der Universität Ulm

Helmholtzstraße 12  
89081 Ulm, Germany  
Phone: +49 731 1429-0  
Fax: +49 731 1429-42  
E-Mail: info@ilm.uni-ulm.de  
Internet: www.uni-ulm.de/ilm

## Director:

Prof. Dr. rer. nat. Rudolf Steiner (Director)  
Prof. Dr. rer. nat. Raimund Hibst (Vice Director)

## Contact for inquiries:

Wolfgang Strauss, Phone: +49 731 1429-21

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## RESEARCH AREAS

Research and development of medical laser applications in

### Therapy:

Basic investigations on laser tissue interactions, experimental studies and clinical tests of therapeutic applications of novel medical lasers in various medical disciplines, photodynamic therapy, minimal invasive surgery, laser ablation of tissue, Laser-Therapy-Center.

### Diagnostics:

Basic research on light propagation in tissue, spectroscopic methods for tissue diagnostics, optical tomography by short coherence interferometric methods, laser doppler velocimetry on biological systems, shock wave measurements in tissues, fluorescence microscopy (FLIM, FERT, FRAP), biological test systems, nonlinear imaging techniques.

Research and development of dental technologies

- Basic investigations on tooth optics;
- Laser application in therapy, surface modifications and prevention;
- Optical diagnostic devices (caries, periodontics).

Research and development of laser applications in

### Metrology:

Photothermal devices for material testing, evaluation of thermal parameters and for measurements of thermal variations in near-surface layers, surface metrology by tactile, optical and acoustic methods, fringe pattern projection for form and shape measurements, application of optical measuring techniques on medical problems.

## FACILITIES

- Various laser systems (pulsed and cw) from UV to IR, femtosecond system;
- Microscope systems for biological and metrological applications (laser scanning microscope, atomic force microscope, photothermal microscope, acoustic nearfield microscope);
- Laser beam analysis;
- Laboratories: histology, cell culture (S1), molecular biology;
- Laser therapy center.

## TARGET GROUPS

Small and medium-sized industry companies, service industries, clinics, doctors, laser industry.

# Institut für Mikroelektronik Stuttgart (IMS)

Allmandring 30a  
70569 Stuttgart, Germany  
Phone: +49 711 21855-0  
Fax: +49 711 21855-111  
E-Mail: info@ims-chips.de  
Internet: www.ims-chips.de

**Director:**  
Prof. Dr. Dipl.-Ing. Joachim Burghartz

**Contact for inquiries:**  
Dr. Harald Richter (Systems)  
Dr. Wolfgang Appel (Si-Technology)  
Dr. Mathias Irmscher (Lithography)

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## COMPETENCE

- **Microelectronic Systems**  
Development of application-specific integrated circuits (ASICs) and chip systems.  
Quick and low-cost realisation of ASICs for professional applications with typically small volumes (100-50,000).  
ASICs for high reliability requirements e.g. space applications.  
CMOS imagers with high-dynamic range (HDRC<sup>®</sup>) adapted to customer-specific requirements, e.g. image sensors for medical applications and surveillance in automatic control engineering.
- **Silicon Technology**  
CMOS 0.5  $\mu\text{m}$  and 0.8  $\mu\text{m}$  technologies.  
Development of custom-specific processes, e.g. for high-voltage applications.  
Services for single processes, e.g. epitaxy, ion implantation, oxidation, plasma etching, and deposition processes.  
Wafers and microchips for specific tests, measuring and calibration engineering.  
Add-on processes, development of manufacturing processes for ultra-thin microchips.  
Assembly technology for ceramic packaging.
- **Lithography**  
Production of complex nanometer structures on wafers and square quartz substrates using E-beam lithography. Development of production technologies for future masks. Manufacturing of two- and three-dimensional replication masters and nanoimprint templates on silicon wafers or quartz substrates. Manufacturing of silicon or silicon nitride membranes with structured absorbers such as aluminium or chromium. Production of diffractive optics.

## FACILITIES

- Complete microchip pilot and state-of-the-art front-end mask line in a 700 m<sup>2</sup> class 10 clean room;
- Quality assurance for the production of ASICs and CMOS image sensors from specification to series production;
- Certified according to ISO 9001 and Approval of Manufacturer QC 001002-3 for microchips.

## TARGET GROUPS

- Users of microelectronics, particularly small and medium-sized companies;
- Users of complex optical components and image sensors;
- Companies and research facilities for cooperation in national and international programmes.

# Institut für Textilchemie und Chemiefasern (ITCF) der Deutschen Institute für Textil- und Faserforschung Denkendorf (DITF)

ITCF Denkendorf  
Körschtalstraße 26  
73770 Denkendorf, Germany  
Phone: +49 711 9340-101  
Fax: +49 711 9340-185  
E-Mail: [info@itcf-denkendorf.de](mailto:info@itcf-denkendorf.de)  
Internet: [www.itcf-denkendorf.de](http://www.itcf-denkendorf.de)

**Director:**  
Prof. Dr. rer. nat. F. Effenberger

**Contact for inquiries:**  
Prof. Dr. rer. nat. F. Effenberger, Phone: +49 711 9340-101  
Dr. rer. nat. B. Clauß, Phone +49 711 9340-126

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## RESEARCH AREAS

- **Chemistry, Physics and Technology of Fiber Formation**  
Spinning experiments with synthetic and natural polymers; super-high-speed spinning; reactive extrusion; synthesis of fiber polymers; cellulosic fibers; polymer modification to improve processing behavior; structure investigations of fibers; optical online-measurements to determine the molecular orientation in fiber polymers.
- **Intelligent Materials and Nanostructures**  
Application of nanoparticles in fibers, on surfaces and within coatings; micro- and nanoporous fibers and coatings; oxide and non-oxide ceramic fibers for special applications (high temperature, catalysis, ceramic- and metal reinforcement; high performance carbon fibers).
- **Innovative Textile Finishing Processes**  
Optimization of conventional textile finishing; environmentally-friendly finishing; novel non-aqueous processes (plasma, UV, electron beam); innovative dyeing and printing processes (e.g. Inkjet).
- **Chemistry of Technical Textiles and Textile Composite Materials**  
Surface modification and -functionalization; coating and laminating; novel coating processes and -materials; super-absorbent polymers; smart textiles.

- **Testing of Polymers, Fibers and Textiles**  
Methods for physical, chemical and textile specific analysis and testing.

## FACILITIES

- Reactors for production of polymers and pilot-devices for processing;
- Modern equipment and devices in order to perform finishing, dyeing, printing and coating trials;
- Analytical equipment and methods of characterisation for analysis of polymers, fibers, textiles and auxiliaries;
- (Electron)optical facilities in order to visualise surfaces, X-ray analysis to characterise fiber structure;
- Necessary equipment in order to determine fastness properties of textiles towards light exposure, washing and every day use.

## TARGET GROUPS

- Fiber producing and processing industry, industry for textile auxiliaries;
- Textile finishing industry, producers of dyestuffs, finishing products and auxiliaries.

# Institut für Textil- und Verfahrenstechnik Denkendorf (ITV) der Deutschen Institute für Textil- und Faserforschung Denkendorf (DITF)

Körschtalstraße 26  
73770 Denkendorf, Germany  
Postfach 11 55  
73766 Denkendorf, Germany  
Phone: +49 711 9340-0  
Fax: +49 711 9340-297  
E-Mail: [itv@itv-denkendorf.de](mailto:itv@itv-denkendorf.de)  
Internet: [www.itv-denkendorf.de](http://www.itv-denkendorf.de)

**Director:**  
Prof. Dr.-Ing. Heinrich Planck

**Contact for inquiries:**  
Prof. Dr.-Ing. Heinrich Planck, Phone: +49 711 9340-216

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## RESEARCH AREAS

### ▪ **Fiber- and Yarn Technologies**

Development of new polymers for fibres and membranes, particularly for medical applications; processing of filament and staple-fibres using conventional and innovative spinning technologies; finishing and surface activation of yarns. Fields of research are renewable resources, polymer synthesis, filament-yarn technologies, staple-fiber technologies, filament-yarn processing and winding technology.

### ▪ **Fabric- and Structure Technologies**

Research of traditional fabric-manufacturing processes (production of woven fabrics and knitwear, using knitting and warp-knitting methods) as well as nonwoven technologies, braiding and fibre-composite technology.

### ▪ **Functionalization**

Functionalization of textile materials using special-surface technologies. Development of innovative products with new properties, such as textiles with self-cleaning surfaces and high-performance coatings. This research area is based on surface technologies, nanotechnologies, bionics, processing technologies (cutting and joining) and flock technology.

### ▪ **Innovative and Intelligent Products**

Product R & D, with particular emphasis on industrial textiles, textiles for environmental technology, smart textiles, biomaterials, medical textiles and textile constructions.

### ▪ **Modern Production**

Developments to provide mid-size enterprises with advice and assistance they need to implement state-of-the-art manufacturing methods. Fields of research are process and manufacturing automation, environmental technology, quality assurance and sound control.

### ▪ **Testing of textile materials**

General and special textile tests at the following labs: central testing laboratory, specialist laboratories for industrial textiles and biology testing laboratory.

## FACILITIES

Testing equipment in line with laboratory and industrial standards for all key textile-production processes; central testing laboratory for general tests (physico-chemical); specialist laboratories for industrial textiles; biology testing laboratory.

## TARGET GROUPS

Textile industry and related groups of industry, textile engineering industry, manmade fiber industry; manufacturers and users of industrial textiles and biomedical products; manufacturers and users of process control, handling devices and measuring equipment.

# Centre for Management Research (DITF / MR) of the German Institutes for Textile and Fibre Research Denkendorf (DITF)

Körschtalstraße 26  
73770 Denkendorf  
Postfach 11 55  
73766 Denkendorf

Phone: +49 711 9340-238  
Telefax: + 49 711 9340-302

E-Mail: [thomas.fischer@ditf-denkendorf.de](mailto:thomas.fischer@ditf-denkendorf.de)  
Internet: [www.ditf-denkendorf.de](http://www.ditf-denkendorf.de)

## Head of Department:

Prof. Dr. rer. pol., habil. Ing. Thomas Fischer

## Partner for inquiries:

Prof. Dr. rer. pol., habil. Ing. Thomas Fischer  
Tel: +49 711 9340-238

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## MAIN APPLICATION OF ACTIVITY

### ▪ Innovation management and knowledge management

Development and implementation/testing of knowledge-based management methods and information technologies for the co-operative development of new textile structures and procedures, in particular for cooperative Design and appropriate network management.

### ▪ Supply Chain Management und Electronic Business

In the context of the concept of the Extended Smart organization knowledge-based planning and monitoring in dynamic enterprise networks (Dynamically Networked Enterprises) along the textile creation of value chain are pursued. For new forms of co-operation between the partners from textile industry, clothing industry and trade as well as logistics the necessary conceptional and technical bases are created and practically tested in the form of pilot applications. In addition conceptionally new forms of interaction and service between industry and trade, which are only made possible by Internet technologies, are tested and Web-based services for the clothing industry are developed.

### ▪ Integrated management systems

Increasing importance is attached to the integration of quality-, environment-, safety and risk management in enterprises. Together with enterprises of the textile sector and their partners solutions are developed and implied.

### ▪ Production management and logistics

Development and testing of concepts for process monitoring of textile manufacturing. Based on individual firm-specific tasks for instance for the preparation optimization of weaving looms, references and solutions for the improvement of the IT structures in the enterprise are compiled.

### ▪ Vocational training and further training

Together with the Association of the German Textile and Fashion Industry a e-Learning-platform VIBINET - the virtual education network for textile processing and management is developed.

## EQUIPMENT

Tools for business process modeling, for life cycle management, for simulation and optimization, for quality and environmental management, for knowledge management, for risk management as well as for the structuring and implementation of Computer Supported Cooperative Work (CSCW Systems), Web Applications, Web Hosting and e-Learning platforms.

## TARGET GROUPS

Textile and the clothing industry, textile mechanical engineering, chemical fibre industry, chemical industry, service providers (esp. IT service providers), appliers and user of textile products (enterprises in adjacent sectors), professional associations, public bodies.

# Lederinstitut Gerberschule Reutlingen e.V. (LGR)

## Lehr-, Prüf- und Forschungsinstitut

Erwin-Seiz-Straße 9  
72764 Reutlingen, Germany  
Postfach 29 44  
72719 Reutlingen, Germany  
Phone: +49 7121 1623-0  
Fax: +49 7121 1623-11  
E-Mail: lgr@lgr-reutlingen.de  
Internet: www.lgr-reutlingen.de

**Director:**  
Dr.-Ing. Heinz-Peter Germann

**Contact for inquiries:**  
Dr.-Ing. Heinz-Peter Germann, Werner Luz

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### RESEARCH AREAS

- Applied research and development in the field of leather manufacturing and fur dressing.
- Leather technology, quality assurance to produce leather in an environmentally acceptable way and to reduce environmental pollution.
- Modern chemical and physical analysis on leather and fur including analysis for harmful substances.
- Environmental analysis, treatment of waste water, sludges and waste air.

### FACILITIES

- Accredited testing and research laboratories for all chemical and physical analysis in the field of leather and fur as well as for the environmental area (UV/VIS-, FTIR-spectroscopy, AAS, GC-MS, HPLC, GC-ECD, ICP);
- Own modern testing tannery for even large-scale production.

### TARGET GROUPS

Leather industry including supplying industries and related areas such as raw hide winning, utilization of by-products generated by leather production, manufacturing of leather goods, chemical auxiliary supplying industry.

# NMI Naturwissenschaftliches und Medizinisches Institut an der Universität Tübingen

Markwiesenstraße 55  
72770 Reutlingen, Germany  
Phone: +49 7121 51530-0  
Fax: +49 7121 51530-16

E-Mail: mueller@nmi.de, haemmerle@nmi.de  
Internet: www.nmi.de

## Director:

R. Enzo Müller, Ph.D (Director of Institute)  
Prof. Dr. Hugo Hämmerle (Deputy managing director)

## Contact for inquiries:

R. Enzo Müller, Ph.D, Phone: +49 7121 51530-10  
Prof. Dr. Hugo Hämmerle, Phone: +49 7121 51530-45

## RESEARCH AREAS

### Pharmaceutical biotechnology:

Reverse Screening, cell culture technique, neurobiology, molecular biology, cellular assay systems, immortalization bioanalytics, peptide synthesis (combinatorial libraries peptide sets, cyclopeptides phosphopeptides, stable isotope labelled peptides etc.), protein analysis, RNA-QC-analysis, protein profiling, screening, protein microarrays, protein expressions analysis, miniaturised multiplexed assaysystems, antibody characterisation, epitope mapping, affinity determination, biochip technology, assay development, electrophysiology, target validation-functional analysis of proteins siRNA/shRNA vectors, Blood-Brain-Barriers, BioMEMS.

### Medical devices:

Neurotechnology, tissue engineering, development of medical products, biomaterials.

### Surface and Interface Technology:

Microsystems, nanolithography, surface functionalization and coating, bonding, nano- and microanalysis, tribology.

Cell cultures, immunochemistry, biochemistry, in vitro toxicity, intracellular Ca-fluorescence, Luminometer, TaqMan, Fluometer;

Elektrophysiology: Robocyte<sup>®</sup>, patch clamping, microelectrode applications, electrical stimulation;

Protein array facility: clean room, BioChip Arrayer<sup>™</sup>, Gesim Nanoplotter NP2.0, Scanarray Gix Microarray Scanner, biacore 3000, Luminex 100<sup>™</sup>, Luminex HTS, GeSim-Arrayer NP1.2, Pipettierroboter Tecan Genesis RSP100, QIAGEN Pipettierroboter Biorobot 3000, Zeptosens ZeptoReader F3000, BD Biosciences BD FACSArray;

Laboratory for sensor development, electrochemistry, fibre-optics, multi-channel potentiostat, impedance spectroscopy, micro-fluidic systems;

Peptide synthesis: 2 x SyRO<sup>™</sup> multiple peptide synthesizer (1mg – 100mg scale), Pioneer<sup>™</sup> and Prelude<sup>™</sup> peptide synthesizer, lyophilisation systems, Varian and Gynkotec preparative HPLC systems, Combi Flash Sq 16x multiple flash-LC-system;

Bioanalytics facility:

- Mass spectrometry: ESI-QTOF-MS, Quattro micro ESI-triple quadrupole MS, Biflex<sup>™</sup> III MALDI-TOF-MS;

- HPLC systems: 2x HP 1100, Gynkotec HPLC systems SMART<sup>™</sup> Micro HPLC system with UV-, fluorescence-, evaporative light scattering- (ELSD) and mass spectrometric (MS) detection;

- Pipetting-systems for sample preparation, Capillary-electrophoresis;

Electron beam evaporation, plasma reactor, CVD reactor, microdrop/et dispenser/-arrayer, micro contact printing;

Ultrasonic measurement technique (cavitation distribution).

## FACILITIES

Secondary Ion Mass Spektrometry (SIMS), Secondary Neutral Mass Spektrometry (SNMS), X-ray Photoelectron Spectroscopy (XPS), Auger Electron Spectroscopy (AES), Scanning Auger Electron Spectroscopy (SAM);

S2-facility, viral vectors;

Focused Ion Beam (FIB); Transmission Electron Microscopy (TEM) with EDX and PEELS, Scanning Electron Microscopy (SEM, ESEM) with EDX and digital Image Analysis, Confocal Laser Scanning Microscop (CLSM), Atomic Force Microscop (AFM), Scanning Tunneling Microscop (STM);

BET and Hg-Porosimetry, UV-, -visible, NIR-Spectroscopy, AAS, GC, X-ray Fluorescence Analysis (RFA), Profilometry, FTIR-Spectroscopy, Raman Spectroscopy, Ellipsometry;

Cleanroom, microstructure laboratory, thin- and thick film deposition laboratory, exaporation system, RF-Sputtering, screenprinting, galvanic and chemical film deposition, PECVD-system, laboratory for adhesive joint techniques, laboratory for material testing, optical lithography;

## TARGET GROUPS

Industry;

University institutes, other research institutes;

Governmental agencies with R & D requirements.

# Zentrum für Sonnenenergie- und Wasserstoff-Forschung (ZSW) Baden-Württemberg

Industriestraße 6  
70565 Stuttgart, Germany  
Phone: +49 711 7870-0  
Fax: +49 711 7870-100  
Internet: www.zsw-bw.de

Division Ulm:  
Helmholtzstraße 8  
89081 Ulm, Germany  
Phone: +49 731 9530-606  
Fax: +49 731 9530-666

## Executive Board:

Prof. Dr. Frithjof Staif (Managing Director)  
Dr. rer. nat. Hansjörg Gabler  
Prof. Dr. Werner Tillmetz

## Contact for inquiries:

K.-H. Frietsch, Phone: +49 711 7870-206  
E-Mail: karl-heinz.frietsch@zsw-bw.de

## RESEARCH AREAS

Application-oriented research and development, technology transfer in the following areas:

### Photovoltaics Division

(Dr. rer. nat. Hansjörg Gabler, Phone: +49 711 7870-257, Fax: +49 711 7870-230):

#### Materials research:

Production and analysis of thin layers (metallic, semiconducting, insulating), thin-film solar cells and modules. Flexible solar modules, thin-film modules for aerospace, focus on CIS technology.

#### Photovoltaic applications:

Energy yields and long-time stability, mechanical tracking of the sun with solar receiver surfaces, solar modules for roof and façade integration.

### Renewable fuels and processes

(Dr. Michael Specht, Phone: +49 711 7870-218, Fax: +49 711 7870-200):

CO<sub>2</sub>-recycling, fuels from biomass, hydrogen production, production of synthesis gas, methanol.

### Electrochemical Energy Conversion and Storage

#### Division

(Prof. Dr. Werner Tillmetz, Phone: +49 731 9530-606, Fax: +49 731 9530-666):

#### Battery storage:

Condition test of batteries, safety tests, risk and environmental effect assessment, conventional batteries (Pb/PbO<sub>2</sub>-, Ni/Cd-), advanced batteries (Li, Ni/MeH, supercapacitors).

#### Applied electrochemistry and material science:

Material analysis and R&D, conventional and advanced batteries and supercapacitors.

#### Fuel cells:

Low-temperature FC (PEMFC, DMFC), material R&D, cell and stack design, system integration and testing.

#### Modelling of electrochemical processes and systems:

Modelling and simulation of electrochemical processes and systems (FC, batteries).

### Systems analysis (interdepartmental task)

(Dr. Ole Langniß, Phone: +49 711 7870-226, Fax: +49 711 7870-200):

Technology assessment, system interconnection (grids, stand-alone systems), marketing strategies.

## FACILITIES

Laboratory for thin-film photovoltaics, photovoltaic outdoor test plant Widderstall near Merklingen; sputter deposition and high vacuum coating units, spectroscopy for special surface analysis, diffractometry, test laboratory for batteries and fuel cells, laboratory for material synthesis, simulation tools (components and systems).

## TARGET GROUPS

Politicians, commercial enterprises, public authorities, European Union.

# Fraunhofer Institute for Applied Solid-State Physics IAF

Tullastraße 72  
79108 Freiburg, Germany  
Phone: +49 761 5159-0  
Fax: +49 761 5159-400  
Internet: [www.iaf.fraunhofer.de](http://www.iaf.fraunhofer.de)

**Director:**  
Prof. Dr. rer. nat. Oliver Ambacher

**Contact for inquiries:**  
Dr. rer. nat. Harald D. Müller, Phone: +49 761 5159-458

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## RESEARCH AREAS

The Fraunhofer Institute for Applied Solid State Physics - IAF in short -, is a leading research center in the field of III-V compound semiconductors and their applications in micro-, nano- and optoelectronics. Our business units are:

- **MMICs**, monolithic integrated microwave and millimeter wave circuits for frequencies up to 340 GHz;
- **Mixed-signal and multifunctional integrated circuits** for data rates up to 100 Gbit/s;
- **Infrared Sensors**, for wavelengths from 3 to 20  $\mu\text{m}$ ;
- **Semiconductor Lasers and LEDs**, from ultraviolet to infrared;
- **Diamond Disks**, and synthetic diamond products for various technical applications.

The following core competencies are available to serve our business units:

- **Design** of electronic and optoelectronic devices and integrated circuits;
- **Epitaxy** of all relevant III-V semiconductor compound materials including nitrides and antimonides;
- **Technology** for fabrication of devices, integrated circuits and modules in small volumes;
- **CVD-Diamond Technology** for fabrication of synthetic diamond disks and diamond products.

The institute is certified according to ISO 9001:2000 by TÜV CERT.

## FACILITIES

- CAD-systems for design and simulation of III-V devices and circuits;
- Epitaxy equipment (MBE and MOCVD) for III-V and II-VI compound semiconductors;
- Complete clean-room technology including mask fabrication;
- CVD reactors for the fabrication of diamond disks;
- Full analytic facilities (SIMS, X-ray, optical spectroscopy, etc.);
- High-frequency measurement and characterization up to 325 GHz;
- Lifetime and reliability measurements.

## TARGET GROUPS

Manufacturers and users of micro- and optoelectronic components for civil and defence related applications.

# Fraunhofer Institute for Industrial Engineering IAO

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70569 Stuttgart, Germany  
Phone: +49 711 970-01  
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Internet: [www.iao.fraunhofer.de](http://www.iao.fraunhofer.de)

**Director:**  
Prof. Dr.-Ing. Dr.-Ing. E. h. Dieter Spath

**Contact for inquiries:**  
Dipl. rer.com Claudia Garád, Phone: +49 711 970-2124

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## RESEARCH AREAS

- Technology and Innovation Management
- Research and Development Management, Virtual Engineering
- Service Development, Service Management, Service Engineering
- Human Computer Interaction
- Information technology, Software Management

## FACILITIES

In our laboratories, demonstration- and consulting centres our teams prove and evaluate virtual and real prototypes, advanced technologies and innovative products in a practical environment. These facilities help companies to judge new products or systems. Together with its cooperation partner – the Institute of Human Factors and Technology Management (IAT) of University Stuttgart the Fraunhofer IAO decreeds over 2000 squares meters of laboratory area.

## TARGET GROUPS

Industry, service companies and public authorities.

# Fraunhofer Institute for Buildings Physics IBP

Nobelstraße 12  
70569 Stuttgart, Germany  
Phone: +49 711 970-00  
Fax: +49 711 970-3395  
Internet: [www.ibp.fraunhofer.de](http://www.ibp.fraunhofer.de); [www.bauphysik.de](http://www.bauphysik.de)

## Director:

Prof. Dr. -Ing. Gerd Hauser  
Prof. Dr. -Ing. Dipl.-Phys. Klaus Sedlbauer

## Contact for inquiries:

Dipl.-Phys. Norbert König, Phone: +49 711 970-3370

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## RESEARCH AREAS

Research, development, testing, demonstration and consulting in the fields of:

- Building, room and technical acoustics;
- Building chemistry, -biology, hygiene;
- Heat and thermal insulation technology;
- Low-energy and solar houses;
- Energy systems;
- Energy economy in buildings;
- Lighting technology;
- Development and testing of new building materials, -components and -systems;
- Recycling of waste and residual materials in construction engineering;
- Chimneys and heating equipment;
- Moisture technology and hygrothermics;
- Preservation of buildings and historical monuments;
- Outdoor weathering experiments, material technology;
- Heat and moisture transfer in building components and structure;
- Healthy and sustainable building materials;
- Indoor climate, climatic impacts.

The institute is officially recognized for the construction supervision authorities for testing, monitoring and certification of building products and types of construction in Germany and all over Europe.

## FACILITIES

Laboratories, special test and experimental plants for all building physical investigations (e.g. climate chambers, acoustical testing rooms, wind tunnels for acoustic and aerodynamic tests of sound absorbers, large outdoor experimental stands on building physics to a scale 1:1, comparable single-family model houses for the examination of solar, heating and ventilation systems, large-scale simulation for daylight and artificial lighting techniques investigations).

## TARGET GROUPS

- Enterprises engaged in the field of civil engineering, mechanical and plant engineering;
- Manufacturers of sound and/or thermal insulating products for building applications;
- Building contractors and architects;
- Planning and licencing authorities for building construction and civil engineering;
- Public and private building research institutions.

# Fraunhofer Institute for Chemical Technology ICT

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76327 Pfinztal, Germany  
Postfach 12 40  
76318 Pfinztal, Germany  
Phone: +49 721 4640-0  
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E-Mail: info@ict.fraunhofer.de  
Internet: www.ict.fraunhofer.de

**Director:**  
Prof. Dr.-Ing. Peter Elsner

**Contact for inquiries:**  
Dr. Stefan Tröster Phone: +49 721 4640-392

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## RESEARCH AREAS

The Fraunhofer ICT conducts research and development in the following fields:

- **Energetic materials**
- **Energetic systems**
- **Polymer engineering**
- **Environmental engineering**
- **Applied electrochemistry**

Consequently, we are also able to solve problems in related fields.

## FACILITIES

- Facilities for mechanical and chemical processing technology of polymers and composites;
- Application center for compound and fibre reinforced plastics;
- Equipment for qualification of technical products by environmental testing;
- Material laboratory for destructive, non-destructive and analytical material testing;
- Laboratories for chemo-physical analysis and spectroscopy;
- Laboratories for electro-optical and acoustical measuring technology, sensorics, high speed and super high speed cinematography;
- Combustion facilities for plastics and for high pressure combustion;
- Testing facilities for energetic materials.

## TARGET GROUPS

Manufacturers, processors, users and waste operators of engineering plastics and chemical energetic materials as for example

- Car industry and suppliers;
- Aerospace industry and suppliers;
- Transport industry and packaging manufacturers;
- Energy suppliers;
- Waste management and treatment corporations;
- Measuring technology and sensor manufacturers;
- Public sector.

# Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB

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70569 Stuttgart, Germany  
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**Director:**  
Prof. Dr. Herwig Brunner

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## RESEARCH AREAS

The Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB develops and optimizes processes and products in the fields of

### **Functional interfaces for industry and medicine:**

Molecularly defined and smart surfaces, ultra-thin layers, biomimetic and biofunctional surfaces, nanobiotechnology, nanoparticles, carbon nanotubes, membranes.

### **Tissue engineering for medical technology, diagnostics, drug development and regenerative medicine:**

3D organoid human test systems, biocompatibility testing, autologous transplants, cell sorting and cell therapy, GMP-compliant manufacturing of tissue engineering products.

### **Molecular biotechnology for pharma and diagnostics:**

Research in infectious diseases, drug screening, assay development, biochip technologies (genomics and proteomics), protein expression.

### **Industrial / White biotechnology:**

Enzyme screening and optimization, biotransformation, fermentation and downstream processing, production of natural substances (vitamins, nutraceuticals) by microalgae.

### **Sustainable bioprocess engineering for industry, urban infrastructure, and the environment:**

Reprocessing and conversion of organic raw and waste materials, generation of biogas, wastewater purification and urban water management.

## LABORATORIES AND TECHNICAL FACILITIES

### **Infrastructure, laboratory equipment**

- Plasma reactors for cleaning, sterilization, pre-treatment, activation, modification and coating of surfaces
- Electron (TEM, SEM) and probe (AFM) microscopes
- Spectrometers for analysis of surfaces and thin layers
- Plants for the production and testing of membranes
- Molecular biotechnology and cell culture laboratories up to biological safety level BL , with modern equipment, e.g. inverse fluorescence microscope, FACS, Raman-AFM
- GMP production unit (cleanrooms, separate quality control area, storage facilities) up to biological safety level BL2
- Microarray facility
- Bioreactors of various types and sizes (laboratory, pilot and technical scale)
- Mobile membrane bioreactors for wastewater treatment
- Pilot plants (applications for environmental and sterile technology)
- Isotope laboratory
- Laboratories dedicated to chemical and biochemical analysis, disposing of a comprehensive range of chromatographic, spectroscopic and electrophoretic equipment
- MALDI-TOF / TOF-MS
- Central storage facilities for chemicals and hazardous compounds

## TARGET GROUPS

The Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB in Stuttgart develops and optimizes biotechnological processes and products for the environment, health, and technology. Our customers include industrial companies from a variety of sectors as well as municipal, state (Länder) and federal authorities.

# Fraunhofer Institute for Information and Data Processing IITB

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Internet: [www.iitb.fraunhofer.de](http://www.iitb.fraunhofer.de)

**Director:**  
Prof. Dr.-Ing. Jürgen Beyerer

**Contact for inquiries:**  
see Director

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## RESEARCH AREAS

- Process control technology in production facilities;
- Planning, control and optimisation in industry and services;
- Communication applications in production, services and offices;
- Vision systems, solution of complex measurement tasks, quality control;
- Automatic surveillance systems, property protection, safety and security, reconnaissance;
- Man-system-interaction in tele-exploration;
- Management of provision of (public) utilities, disposal, energy and water;
- Security in software and configuration;
- Machine Vision;
- Robotics and humanoid robotics;
- Knowledge-Management.

## FACILITIES

- Demonstration centre for image analysis, evaluation of image sequences in real time;
- Accredited test lab for LAN protocols and fieldbus, EMC test lab;
- Multisensor-Lab;
- Test lab for industrial automation equipment, simulation tools;
- Testbed for combustion engines, experimental vehicles;
- Fault-tolerant, distributed fibre optic computer network;
- Demonstration center for control systems;
- Industrial robots;
- Software develop environments;
- Equipment for signal processing and pattern recognition.

## TARGET GROUPS

Production industry in all fields, service industry, communities, public authorities.

# Fraunhofer Institute for High-Speed Dynamics, - Ernst-Mach-Institut, EMI

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## BUSINESS SEGMENTS

The Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI deals with physical-technical aspects of high-speed, mechanical, and fluiddynamic processes. In parallel to the experiments, theoretical work is performed in the field of "Computational Mechanics".

### Space Activities

In the field of Space Activities, the spectrum of topics includes scientific-technical studies ranging from impacts of micro-meteorites and space debris on spacecrafts to planetary collision processes.

Methods applied cover impact experiments as well as – to an increasing degree – the use of numerical simulation. At the same time, the focus lies on the development of security systems for crewed space flight and satellites.

Further focal areas are development of an accelerator for hypervelocity speed, characterization of material and structural behavior at high impact speed, conducting risk and vulnerability analyses for spacecrafts and their components in case of impact loading as well as development of special sensor technology for spacecrafts (impact detectors, health monitoring systems).

### Safety

In the business segment safety, safety technologies for critical infrastructure are enhanced, and protection concepts for buildings against blast load are developed.

This includes the assessment of the residual load carrying capacity of dynamically damaged reinforced concrete structures, and damage management in case of emergency.

Explosion-damping components are tested for their conformity with stand norms.

Risk analyses for civil infrastructure like cities, communal facilities and industrial plants are part of this research area.

### Traffic

Characterization and modeling of materials, the analysis of components, and improvement of crash elements are the core topics in the business segment traffic. This includes characterization of materials under static and dynamic load, development of material models for predictable numerical simulations, crash tests with vehicle components, and development and application of static and dynamic analysis and material testing methods.

A second area deals with the numerical simulation of crash processes and the development of numerical methods for crash simulation.

### Defense

In the fields of defense research, the Ernst-Mach-Institut works on general themes concerning the protection of soldiers on behalf of the Federal Ministry of Defence and industry partners. This includes testing, evaluation and optimization of protection technologies for vehicles, aircrafts, and ships. Protective superstructures using new materials are studied as well. Research work aims at the best possible solutions for the protection of military and civil population against catastrophes and emergencies.

## FACILITIES

- Crash-test facility for car components;
- Test facilities for dynamic material behavior;
- Acceleration facilities for terminal ballistic and penetration analyses;
- High-speed camera systems, Tomo-cinematography;
- Compute Server/Linux Cluster;
- Shock tubes;
- Blast chamber;
- Blast vessel.

## TARGET GROUPS

- Public authorities;
- R&D divisions of worldwide industry;
- Automotive industry and suppliers;
- Aerospace industry.

# Fraunhofer Institute for Physical Measurement Techniques IPM

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79110 Freiburg, Germany  
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**Director:**  
Prof. Dr. Elmar Wagner

**Contact for inquiries:**  
Dr. Annette Braun, Phone: +49 761 8857-129

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## RESEARCH AREAS

Fraunhofer IPM offers customized measurement and imaging technology to the industry. Fraunhofer IPM staff carries out technical development including market surveys as well as serial production or the setting-up of fully functional systems on site. At each stage of the development process the market's demands and the requirements of users are of utmost importance.

- **Bioanalytics:** Fraunhofer IPM develops robust bioanalytical systems with a special focus on automated monitoring of biological samples, especially cell cultures.
- **Measurement of geometrical parameters:** Fraunhofer IPM develops laser based distance measurement systems. The institute has gained extensive expertise in rapid two- and three-dimensional measurement techniques, including substantial know-how in highly dynamic signal processing.
- **Gas and fluid analysis:** For analyzing gas and fluids, Fraunhofer IPM relies on absorption spectroscopy in the mid infrared and realizes measurement systems which are capable of detecting molecules very fast, sensitively and with a high selectivity. The measurement devices are suitable for monitoring processes, determining the emission of automobiles as well as for environmental analyses. Fraunhofer IPM takes a different approach with its semiconductor gas sensors particularly suitable for a continuous monitoring of gas concentrations.
- **Imaging systems:** Fraunhofer IPM has been repeatedly awarded for its laser imaging systems. The competencies in this area gained over the years now enter an imaging system for color microfilm. Such systems make tremendous demands on the technology applied: optics, mechanics, electronics and software have to be adjusted perfectly.
- **Railroad measurement:** Railroad measurement systems made by Fraunhofer IPM can be found in operation all over the world. They supply data on the position of contact wires, the degree of wire abrasion as well as the clearance profile of tunnels. Apart from measurement techniques, reaching the limit of viability, the extreme conditions on site demand an outstanding achievement of the developers:

The systems have to withstand rain, dust and heat and, moreover, deliver results with constant precision.

- **Thermoelectrics:** Fraunhofer IPM is one of the leading European research organizations in the field of thermoelectrics. The Institute is involved in the development of novel nanoscale thinfilm and bulk materials, thermoelectric components (incl. MEMS), special thermoelectric measurement techniques, customized applications and simulation for materials, devices and complete systems. Among other things, the activities aim at using high temperature waste heat for environmentally friendly power generation.

Fraunhofer IPM sees itself as a service provider for development work. Based on its specialists' expertise, it develops novel solutions, customized to meet the requirements of a specific task. Naturally, Fraunhofer IPM's service will be determined by its customers' demands.

## FACILITIES

400 m<sup>2</sup> clean room of the classification 100 and 1000 with technological equipment for developing and manufacturing prototypes of semiconductors and optically integrated components, gas measurement laboratory for characterizing and developing gas measurement systems and sensors, spotter for producing DNA microarrays as well as protein microarrays, interference microscopes, laser scan microscope.

## TARGET GROUPS

Manufacturers and users of measurement and imaging systems. Branches: Chemical and pharmaceutical industry, medical technology, automotive and railroad industry, environmental engineering and media technology.

# Fraunhofer Institute for Manufacturing Engineering and Automation IPA

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70569 Stuttgart, Germany  
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Fax: +49 711 970-1399  
Internet: www.ipa.fraunhofer.de

**Director:**  
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Prof. Dr.-Ing. Alexander Verl

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E-Mail: hbg@ipa.fraunhofer.de

## RESEARCH AREAS

The core competencies of the Fraunhofer IPA are organized in five business fields with a total of 10 departments.

- **Corporate Management**
  - Product Management;
  - Industrial Engineering;
  - Quality Management.
- **Enterprise Logistics**
  - Factory and Logistics Planning;
  - Order and Process Management;
  - Supply Chain Management and E-business.
- **Automation Systems**
  - IT for Engineering;
  - Robot Systems;
  - Assembly Systems.
- **Manufacturing Automation**
  - Cleanroom Manufacturing;
  - New Applications.
- **Manufacturing Technologies**
  - Information Processing;
  - Surface Engineering;
  - Coating Technologies.

## FACILITIES

- Special Laboratories and plants for electrochemical deposition (ECD), physical and chemical vapour deposition (PVD/CVD), coating technology, material testing, process management, recycling technology;
- Test station for industrial robots;
- Centre for coordinate measurement technology;
- CAD/CAM systems for integration of testing instruments;
- CAD systems with interactive graphics simulation;
- CAQ test field with computer system FMEA, SPC; diagnosis;
- Test lab for industrial robots, development and application, assembly automation;
- Test centre for semiconductor manufacturing equipment, test cleanroom (150 m<sup>2</sup>) class 1 and better;
- Demonstration centre „Virtual Reality“;
- Consulting station „Flexible Assembly Automation“;
- Demonstration centres „Virtual Reality“ and „Simulation in Production and Logistics“.

## TARGET GROUPS

Manufacturing companies in trade and industry.

# Fraunhofer-Institut für Silicatforschung ISC

## Außenstelle Bronnbach

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97877 Wertheim, Germany  
Phone: +49 9342 9221-701  
Fax: +49 9342 9221-799  
Internet: [www.isc.fraunhofer.de](http://www.isc.fraunhofer.de)

**Director:**  
Dr. Andreas Diegeler

**Contact for inquiries:**  
Dr. Andreas Diegeler (measuring and process technology;  
certified mechanical engineering)  
Dr. Peter Mottner (environmental monitoring and conservation  
research)

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### MAIN ACTIVITIES

- Development, construction and engineering of machinery and tools for the characterization and processing of materials, especially glass and ceramics;
- Design and construction of certified test devices and customized units, e.g. calibration units for volumetric instruments and dispensing units for fluids;
- Robotic-supported process control;
- Development of CMOS and laser based optical measuring procedures;
- R&D for the conservation of cultural heritage, including restoration techniques and conservation materials;
- Development of coatings for glass, metals and items of cultural heritage;
- Environmental monitoring services, including sensor studies on the impact of atmospheric influences like rain, temperature, pollutant gas (risk assessment);
- Climate monitoring and early warning systems;
- Environmental simulation tests (accelerated weathering, exposure to pollutant gas or light/UV); mechanical load tests; damage analysis.

### FACILITIES

- Testing laboratory, instrumental analysis (UV/VIS spectrophotometry, FTIR spectroscopy);
- Microscopy;
- Coating laboratory;
- Construction and assembly shops;
- Environmental test equipment (e.g. climate chambers);
- Conference and seminar facilities.

### TARGET GROUPS

- Industry, especially regional small and medium sized companies;
- Public organizations, museums, conservation offices and restoration shops.

# Fraunhofer Institute for Solar Energy Systems ISE

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**Director:**  
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**Contact for inquiries:**  
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## RESEARCH AREAS

- **Buildings and technical building components**  
Building concepts, analysis and operation; facades and windows; lighting technology; energy-efficient and solar cooling; energy supply systems for residential buildings; thermal collectors and applications; heat and cold storage.
- **Optical components and systems**  
Lighting technology; display technology; facades and windows; thermal collectors and applications; solar power plants.
- **Solar cells**  
Silicon materials, crystallization and processing; characterisation of solar cells and materials; dye and organic solar cells; III-V epitaxy and photodiodes; solar cells for space applications; silicon solar cells; process technology for silicon solar cells; crystalline silicon thin-film solar cells; concentrator technology; photovoltaic modules.
- **Off-grid power supplies**  
Systems for grid-independent electricity supply; power electronics and control systems; electric storage systems; micro-energy technology; decentralized PV water purification systems.
- **Grid-connected renewable power generation**  
Distributed power generation; power electronics and control systems; electric storage systems; monitoring and demonstration projects; solar power plants.
- **Hydrogen technology**  
Hydrogen generation and storage; fuel cell systems; micro-energy technology.

- **Services**  
Solar cell and module calibration (ISE CalLab); testing centre for solar thermal systems (PZTS); thermal-optical measurement laboratory TOPLAB and lighting laboratory; test center for photovoltaics; test stand for desiccant-cooling air-conditioning systems; air-exchange measurements with tracer gas; test stand for compact heating and ventilation units; inverter characterisation; battery testing laboratory; qualification testing and optimisation of PV systems.

## FACILITIES

Epitaxy-Systems; semiconductor technology with clean room laboratory for the development of solar cells; Production line for pilot fabrication of solar cells; mass spectrometry; surface analysis; high resolution scanning electron microscope; atomic force microscope; nano structuring of surfaces using photolithography; optical spectrometry: absorption, transmission, reflection; ellipsometry; sputtering facility for large area thin-film technology; DC-Laboratory; EMC testing facility; hydrogen laboratory.

## TARGET GROUPS

Energy technology; urban planning; architects; engineers; building sector; chambers of commerce and trade associations; electrical technology; electronics/semiconductor industry, hydrogen technology/fuel cell industry.

# Fraunhofer Institute for Systems and Innovation Research ISI

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Fax: +49 721 689152  
Internet: [www.isi.fraunhofer.de](http://www.isi.fraunhofer.de)

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## RESEARCH AREAS

- Levels of techno-economic performance and international competitiveness in promising fields of technology, technology foresight;
- Trends, chances, applications and impacts of new information, communication and production systems, of energy and environmental technologies and biotechnology;
- Opportunities for a more effective use of natural resources (energy, raw materials, water, environment);
- Main features of national and international technology, energy and environmental policies;
- Innovation strategies and innovation management in enterprises and their internal organization.

### **These research topics are performed in seven scientific departments:**

- Innovation and technology management and foresight;
- Innovation systems and policy;
- Emerging technologies;
- Regions and market dynamics;
- Industrial and service innovations;
- Energy policy and energy systems;
- Sustainability and infrastructures.

## TARGET GROUPS

Ministries, other public institutions and municipalities, international organizations, business associations and industrial enterprises.

# Fraunhofer Institute for Mechanics of Materials IWM

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Branch institute in Halle

**Director:**  
Prof. Dr. Peter Gumbsch  
Prof. Dr. Ralf B. Wehrspohn

**Contact for inquiries:**  
Thomas Götz, Phone: +49 761 5142-153

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## RESEARCH AREAS

- **High performance materials and tribological systems**  
Wear protection, advanced ceramics; Composite Materials; Biomedical Materials and Implants; Surface Engineering, Micro- and Nanotribology.
- **Safety and availability of components**  
Component Integrity, Fracture Mechanics; Crash Simulation, damage mechanics.
- **Components in microelectronics, microsystems technology and photovoltaics**  
Assessment of Microelectronic System Integration Characterization of Microsystems, Diagnostic of Semiconductor Technologies, Center for Silicon Photovoltaics.
- **Material based process and component simulation**  
Powder Technology, Shaping and Forming, High Temperature Behavior of Metals, Physical Modeling of Materials, Competence Center for Component Simulation SIMBAU.
- **Components with functional surfaces**  
Coatings, Surface Technology; Hot Forming of Glass; Low damage severing and machining.
- **Polymer applications and Biocompatible Materials**  
Polymercompounds, Polymer-based High Performance Composites, Biological Materials and Interfaces, Pilot Plant Center Polymer Synthesis and Processing.
- **Microstructure based assessment of components**  
Microstructure and damage analysis, Residual stress and Materials Fatigue.

## FACILITIES

- **Mechanical Testing**  
Servohydraulic and electromechanical testing machines, high-speed-testing machines, tube testing device, rest rig, pressure device, fatigue testing machines, corrosion and wear testing laboratory, micro-hardness testing device.
- **Structural Analyses**  
X-ray diffraction systems, center-hole drilling equipment, electron microscopes, atomic force microscope, image analyzing system, IR-thermography, high-speed cameras.
- **Process Technology**  
Plasma CVD and PVD coating plants, sputtering plant, ion beam coating plant, hot forming and hot embossing plants, high-precision-milling and turning machines, laser cutting plant, shotpeening plant.
- **Numerical Simulation**  
Network of high-end workstations and linux-cluster with FEM program systems.

## TARGET GROUPS

Companies in the fields of power plant technology, mechanical engineering, shaping tools, glass, optics, ceramics, medical technology, micro electronics.

# Fraunhofer Information Centre for Planning and Building IRB

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70569 Stuttgart, Germany  
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Internet: [www.irb.fraunhofer.de](http://www.irb.fraunhofer.de)  
[www.baufachinformation.de](http://www.baufachinformation.de)  
[www.baudatenbanken.de](http://www.baudatenbanken.de)

**Director:**  
Dipl.-Ing. Thomas H. Morszeck

**Contact for inquiries:**  
Dr. Ingrid Honold, Phone: +49 711 970-2505

## RESEARCH AREAS

Supply of specialized information on building and planning in the fields of

- Building Materials | Building Physics | Building Services
- Building Pathology | Building Maintenance | Monument Preservation
- Architecture | Interior Design | Landscape Design and Planning
- Building Planning | Structural Design
- Civil Engineering
- Building Industry | Construction Operations
- Building and Planning Law | Contractual Building Law
- Town Planning and Spatial Development | Housing.

Offer of the following databases:

- SCHADIS – Information system on building defects, illustrated fulltext database;
- BZP – German and European Technical Approvals;
- IBR – Adjudication reviews in the scope of real estate, planning and building law;
- RSWB – German language literature reference covering all fields of planning and construction;
- ICONDA – The International CONstruction DAtabase – Retrieval of German literature covering all planning and building related fields;
- BAUFO – Building research projects in Germany since 1957
- FORS – Research projects in the fields of housing, urban and regional planning.

## SERVICES

- Building Information service: treatment of all inquiries concerning planning and building, search for literature, supply of data and facts, reference to experts and institutions, information about firms and building products, business information;
- Literature services: search and supply of technical literature;
- Fraunhofer IRB Verlag:  
Specialized monographs, serials of technical books, scientific journals, series of specialized books („Schadenfreies Bauen“, „Bauschäden-Sammlung“, „Bauforschung für die Praxis“, „Bauschadensfälle“, „MONUDOCthema“, „BAUthema“), bibliographies (more than 2 400 subjects), databases CD-ROM/electronic media, research reports of the Fraunhofer Institutes.

## REFERENCE LIBRARY

- More than 160 000 monographs, research reports, test certificates, approvals, construction standards;
- Approx 2 000 journal titles.

## TARGET GROUPS

- Civil engineers, expert engineers, architects,
- Experts, surveyors, researchers on building construction,
- Building contractors, building craftsmen, manufacturers of building products, construction material traders, restorers, monument conservators,
- Town planners, regional planners and landscape planners,
- Governmental institutions, associations, banks, publishing-houses, journalists,
- Private building owners, tenants, lawyers,
- Universities, research organizations, foundations.

# Fraunhofer Technology Development Group TEG

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**Director:**  
Dr.-Ing. Dietmar Wiese

**Contact for inquiries:**  
Dipl.-Wirt.-Ing. (FH) Axel Storz

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## RESEARCH AREAS

Development of new, innovative processes and methods; interdisciplinary approaches to problem solving; implementation of solutions tailored to customer needs in the fields of:

### Innovation and IP-management

- Innovation stimulation
- Innovation evaluation & innovation utilization
- IP management
- Technology management
- Supporting programs

### Integrated product development

- Inertial systems, navigation and sensor fusion
- Integrated produkt design

### Environment and process technology

- Photochemical processes
- Drying by superheated steam
- Processing of potable, process and waste water
- Recycling processes

### Medical technology

- Orthopaedic technology and orthopaedic surgery
- Innovations for spinal column and extremities surgery
- Minimally invasive intervention techniques for radiology/angio-technical/cardio-technical, anaesthesia and surgery applications
- Inertial systems, navigation and sensor fusion

### Mechatronics

- Wireless transmission technology
- Energy harvesting and energy management
- Inertial systems, navigation and sensor fusion
- Carbon nanotubes actuators

### Quality assurance systems

- Rail traffic
- Thermography
- Shearography
- Leak testing

### Development and applications of new materials

- Carbon nanotubes actuators
- Carbon nanotubes application development
- Conductive composites

### European network and funding.

We have access to the know-how of one of the largest R&D institutions in Europe. We network this unique knowledge to achieve practical solutions fit for the future.

## FACILITIES

- 1038 sq metres of test site
- Robotic and handling devices
- Electronic laboratory
- Measuring, testing and examining devices
- Highly available computer equipment
- 3D test benches
- CNT laboratory
- Mechanical workshop

## TARGET GROUPS

Small, medium and big-sized companies of all industry lines.

# Deutsches Zentrum für Luft- und Raumfahrt (DLR) Site Stuttgart

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70569 Stuttgart, Germany  
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Internet: [www.dlr.de/stuttgart](http://www.dlr.de/stuttgart)

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Dipl. Kfm. Christian Jenssen

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## Institute of Technical Physics

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### RESEARCH AREAS

- **High Energy Laser:**  
Development of a Chemical Oxygen Iodine Laser (COIL) as a demonstrator for laser based air defence as well as for the decommissioning of nuclear installations.
- **Solid State Lasers and Nonlinear Optics:**  
Investigations on high power fixed frequency and tuneable Solid State Lasers; Evaluation of directed energy counter measures (DIRCM) in the mid IR using different types of frequency conversion; research on Ultra Short Pulse Lasers.
- **Active / adaptive optical Systems**  
Coherent coupling of Semiconductor and Fibre Lasers in order to increase their peak powers; Development of holographic methods to support new systems for High Resolution Imaging; new techniques for automatic Pointing & Tracking.

### FACILITIES

COIL testbed; Laser laboratory for the characterisation of optical components and optronic materials; Different laser research facilities.

## Institute of Combustion Technology

**Director/contact for inquiries:**

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### RESEARCH AREAS

- The investigation of chemical elementary reactions in combustion;
- Experimental contributions in the field of pollutant and soot formation during combustion processes; the development of mathematical models describing the formation mechanisms;
- Further improvement of laser-optical methods for non-intrusive temperature and concentration measurements in flames;
- Temperature measurement in practical combustion systems with mobile CARS, by commission;
- The development and use of special combustor configurations to solve specific problems in practical combustion and to apply laser-optical methods;
- The use of chemical-kinetic models to verify the experimental results and to enhance practical application;
- The institute is a member of the TECFLAM research group, cooperating with university institutes in Heidelberg, Karlsruhe, Darmstadt and Stuttgart.

### FACILITIES

Shock tubes, flow reactors, flame test rigs for various applications; laser measurement systems, a mobile CARS, Jet-REMPI, HBK-S (High pressure combustion chamber Stuttgart).

# Institute of Technical Thermodynamics

**Director:** Prof. Dr. Dr.-Ing. (habil) Hans Müller-Steinbagen

## Contact for inquiries:

Jörg Piskurek, Phone: +49 711 6862-340  
Fax: +49 711 6862-712  
E-Mail: joerg.piskurek@dlr.de  
Internet: www.dlr.de/TT

## RESEARCH AREAS

- High-efficient and low-polluting energy technologies and use of renewable energy for terrestrial energy supply and traffic systems as well as for space missions;
- Electrochemical energy and storage. Fuel cells (AFC, PEFC, DMFC, SOFC): components, system technology, modelling. High performance electrolysis. DC and RF plasma spray coating technology;
- Solar thermal energy technology. Solar high temperature process gas, methane reforming and direct steam generation for solar power plants. Solar chemistry. Solar process heat;
- Thermal process technology. High performance heat exchangers. Thermal energy storage up to 1000°C;
- Systems analysis and technology assessment. Techno-economic system studies, market penetration and implementation studies, design of environmentally compatible energy systems. Life cycle assessment.

## FACILITIES

- VPS- and RF plasma spraying equipment up to 50 kW<sub>e</sub>, 2 m<sup>2</sup>, industrial prototyping;
- 10 kW PEFC system test facility;
- Impedance spectroscopy, XPS, REM, Solar simulator 3,8 kW;
- Solar flux density measurements;
- Heat exchanger-test facility WÜTA 1,2;
- Test facilities for low and high temperature fuel cells.

# Institute of Structure and Design

**Director:** Prof. Dr. Heinz Voggenreiter

## Contact for inquiries:

Dipl.-Ing. Nicole Lützenburger, Phone: +49 711 6862-569  
Fax: +49 711 6862-227  
E-Mail: nicole.luetzenburger@dlr.de  
Internet: www.dlr.st.de/ibk-index.html

## RESEARCH AREAS

Development and design of extremely lightweight structures, i.e.

- Fibre reinforced composite structures für vehicles, aircraft, space transportation systems and aeroengines;
- Investigation of crash and impact behaviour;
- High temperature structures (up to 2000 °C).

In particular:

- Design and manufacture of fibre reinforced plastics up to 200 °C;
- Cost efficient, automated manufacturing processes for fibre reinforced polymer materials;
- Component development for impact and collision applications with design verification through structural tests and simulation;
- Development of: ceramic composite structures, joining techniques and component design, quality assurance methods;
- Development of: thermal protection systems, oxidation protection coatings, load bearing "hot" structures, combustion chamber for rocket engines, high temperature component testing.

## FACILITIES

- 2 x autoclaves (800 x 2500 mm/250 °C, 1200 x 2750 mm/350 °C);
- Combined fibre winding and tape laying apparatus;
- Robots;
- Heated vacuum table up to 400°C;
- Hot press (450° C, 400 t);
- Instrumental drop tower (10m / bis 600kg);
- Impact test apparatus (2 kg, 300 m/s);
- High velocity testing machine (20 m/s, + 100 kN);
- High temperature component test equipment (1800 °C);
- Pyrolysis and sinter furnaces (up to 2200 °C);
- Water jet cutting machine (1200 x 1200 mm/4000 bar).

## Institute of Vehicle Concepts

**Director:** *Prof. Dr. Ing. Horst E. Friedrich*

**Contact for inquiries:**

*Sanela Parkovic, Phone: +49 711 6862-493  
Fax: +49 711 6862-18318  
E-Mail: [sanela.parkovic@dlr.de](mailto:sanela.parkovic@dlr.de)  
Internet: [www.dlr.de/lfk](http://www.dlr.de/lfk)*

### RESEARCH AREAS

The Institute contributes to a sustainable development of technology systems for future generations of vehicles with emphasis on the following topics:

- Alternative engines and energy conversion;
- Fuel and energy storage;
- Light-weight and hybrid construction methods;
- Synergistic benefits and modularity of the technical systems for road and rail vehicles.

Here the institute primarily works as a system institute acting as a link between special DLR institutes, industrial partners and partners from science with the goal of supplying contributions to environmentally friendly vehicle technologies.

There is also the aim to link research activities in the field of vehicle technology to the Institutes of the University of Stuttgart.

### FACILITIES

- HyLite® electric light-weight vehicle with experimental 20 kWel PEM fuel cell system;
- 20 kWel test facility for dynamically-operable water-cooled PEM fuel cell stacks and peripherals;
- 0,1 - 1kWel test facility for dynamically operated air-cooled PEM fuel cell stacks;
- Test facility for energy management and power train (40 kWel);
- 2 small electric vehicles with air-cooled 0.4 kWel / 0.5 kWel PEM fuel cell systems;
- 1 electric scooter with air-cooled 0.5 kWel PEM fuel cell system;
- 1 remote controlled lab cars with air cooled 0.2 kWel PEM fuel cell systems.

## Site Lampoldshausen: DLR Lampoldshausen, 74239 Hardthausen, Germany

**Director:** *Dipl. Kfm. Christian Jensen*

**Contact for inquiries:**

*Anja Seufert, Phone: +49 6298 28-201  
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Internet: [www.dlr.de/dlr/Organisation/Standorte/lampoldshausen](http://www.dlr.de/dlr/Organisation/Standorte/lampoldshausen)*

## Institute of Space Propulsion

**Director:** *Univ. Prof. Dr.-Ing. Wolfgang Koschel*  
*Phone: +49 6298 28-203, Fax: +49 6298 28-190*  
*E-Mail: [dlr.la.enral@dlr.de](mailto:dlr.la.enral@dlr.de)*  
*Internet: [www.la.dlr.de/en/ra](http://www.la.dlr.de/en/ra)*

### RESEARCH AREAS

- Test facility technology for space propulsion systems;
- Development and operations of high altitude simulation facilities for space propulsion systems;
- Sub- and supersonic air breathing propulsion;
- High pressure combustion cryogenic propellants;
- Systems analysis and combustion chamber modelling;
- Combustion Chamber Technology;
- Life cycle Analysis.

### FACILITIES

- Large test facilities for space propulsion systems;
- Research facilities for rocket and airbreathing propulsion, chemical high energy lasers;
- Optical diagnostics;
- Non-intrusive measurement technologies;
- High-altitude test facilities for satellite- and rocket engines.

# Forschungszentrum Karlsruhe in der Helmholtz-Gemeinschaft

Mailing address: Postfach 36 40, 76021 Karlsruhe  
City office: Weberstraße 5, 76133 Karlsruhe  
Phone: +49 7247 82-0  
Fax: +49 7247 82-5070  
Internet: [www.fzk.de](http://www.fzk.de)

## Executive Board:

Prof. Dr. Eberhard Umbach (Chairman)  
Prof. Dr. Reinhard Maschuw  
(Deputy Chairman)  
Dr.-Ing. Peter Fritz

## Scientific-Technical Council:

Prof. Dr. Oliver Kraft (Chairman)  
Prof. Dr. Manfred Thumm (Deputy Chairman)  
Dipl.-Phys. Georg Henneges  
Hermann-von-Helmholtz-Platz 1  
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Dr. Jens Fahrenberg (Marketing, Patents and Licenses  
Department) Phone: +49 7247 82-5580, Fax: -4814  
E-Mail: [jens.fahrenberg@map.fzk.de](mailto:jens.fahrenberg@map.fzk.de)

## Main research areas:

The Forschungszentrum Karlsruhe is a research institution funded jointly by its two partners, namely, the Federal Republic of Germany and the State of Baden-Württemberg. The Forschungszentrum is one of the largest science and engineering institutions in Europe. Work is embedded in the superordinate program structure of the Helmholtz Association of National Research Centres and concentrates on eleven programs in following five research areas:

- Key Technologies
- Energy
- Earth and Environment
- Health
- Structure of Matter

- Laser structuration,
- Micro electro deposition,
- Machining by cutting,
- Low-cost replication techniques such as micro embossing and micro injection molding.

## FACILITIES

Synchrotron radiation source ANKA, electron beam lithography system, clean room laboratory, laser labs, spectrometry labs. Laboratory facilities for development and characterization of nanostructured materials, NANOMAT – network for nanotechnology materials.

## Program Nano- and Micro Systems

### Head and contact for inquiries:

Dr. Norbert Fabricius, Phone: +49 7247 82-8585  
Fax: -5579  
E-Mail: [norbert.fabricius@mikro-nano.fzk.de](mailto:norbert.fabricius@mikro-nano.fzk.de)

## RESEARCH AREAS

- Molecular electronics,
- Electronic transport in nanoscaled systems,
- Nanostructured materials,
- Tailored nanostructured solids,
- Nanostructured ceramics, nanocomposites,
- Nanocrystalline solids and particles,
- Microoptics, microfluidics, micro process engineering, miniaturized analysis systems,
- Electron, UV and X-ray deep-etch lithography,

## Program Scientific Computing

### Head and contact for inquiries:

Dipl.-Phys. Klaus-Peter Mickel, Phone: +49 7247 82-5600  
Fax: -4972,  
E-Mail: [klaus-peter.mickel@iwr.fzk.de](mailto:klaus-peter.mickel@iwr.fzk.de)

## RESEARCH AREAS

- Establishing a large grid computing centre for high-energy physics,
- Development of grid middleware,
- Grid interfaces and development environments,
- Development of grid programs.

## FACILITIES

IBM RS 6000 SP-SMP, VPP 5000, Linux-Cluster, NEC-SX5.

## Program Scientific Computing

### Head and contact for inquiries:

*Dipl.-Phys. Klaus-Peter Mickel, Phone: +49 7247 82-5600*

*Fax: -4972,*

*E-Mail: klaus-peter.mickel@iwr.fzk.de*

### RESEARCH AREAS

- Establishing a large grid computing centre for high-energy physics,
- Development of grid middleware,
- Grid interfaces and development environments,
- Development of grid programs.

### FACILITIES

IBM RS 6000 SP-SMP, VPP 5000, Linux-Cluster, NEC-SX5.

## Program Nuclear Fusion

### Head and contact for inquiries:

*Dr. Günter Janeschitz, Phone: +49 7247 82-5460*

*Fax: -5467*

*E-Mail: guenter.janeschitz@fusion.fzk.de*

### RESEARCH AREAS

- Superconducting magnets,
- Gyrotron development,
- Solid Blanket and divertor,
- Tritium Technology,
- Neutron source IFMIF,
- Materials research for fusion technology.

### FACILITIES

Tritium laboratory, helium refrigerators, low temperature high voltage lab, test areas for cryo-components, gyrotron test facility.

## Program Nuclear Safety Research

### Head and contact for inquiries:

*Dr. Joachim Knebel, Phone: +49 7247 82-5510*

*Fax: -5508*

*E-Mail: joachim.knebel@psf.fzk.de*

### RESEARCH AREAS

- Safety research for nuclear reactors, safety research for nuclear waste disposal,
- Burning of nuclear wastes.

### FACILITIES

Laboratories and analytical/numerical tools to investigate thermo- and fluiddynamic processes in gases, fluids and liquid metals, installations to investigate radioactive materials, highly resolving measurement techniques, pilot plant for vitrification of highly radioactive liquid waste.

## Program Efficient Energy Conversion

### Head and contact for inquiries:

*Dr. Karl-Friedrich Ziegahn, Phone: (07247) 82-8590*

*Fax: -3949*

*E-Mail: ziegahn@umwelt.fzk.de*

### RESEARCH AREAS

- Superconductivity in energy technology,
- Power plant technology.

### FACILITIES

Low temperature test facilities, pilot combustion plants, test facilities for physical and mechanical material properties, special measurement techniques.

## Program Atmosphere and Climate

### Head and contact for inquiries:

*Dr. Karl-Friedrich Ziegahn, Phone: (07247) 82-8590  
Fax: -3949  
E-Mail: ziegahn@umwelt.fzk.de*

### RESEARCH AREAS

- Climate and water cycle,
- Regional climate changes,
- Trace substances in the troposphere,
- Tropopause region,
- Stratosphere,
- Remote sounding.

### FACILITIES

Precipitation radar, wind-temperature radar, aerosol chamber (80m<sup>3</sup>), Fourier spectrometer, atmospheric models

## Program Sustainability and Technology

### Head and contact for inquiries:

*Dr. Karl-Friedrich Ziegahn, Phone: (07247) 82-8590  
Fax: -3949  
E-Mail: ziegahn@umwelt.fzk.de*

### RESEARCH AREAS

- Protection and regeneration of water resources,
- Processes for carbon management,
- Waste to energy and products,
- Mass flows of building materials,
- Systems analysis and technology assessment.

### FACILITIES

Test facilities for thermal treatment of municipal and special wastes, flue gas treatment, processes for gasification of biomass, chemical synthesis in/with supercritical fluids.

## Program Biomedical Research

### Head and contact for inquiries:

*Prof. Dr. Uwe Sträble, Phone: (07247) 82-2507  
Fax: -3354  
E-Mail: uwe.straeble@itg.fzk.de*

### RESEARCH AREAS

- Genetic causes of cancer and other diseases,
- Development and detection of metastases,
- Establishing of model organisms,
- Gene regulation during embryo-genesis,
- Toxicology of hazardous materials.

### FACILITIES

Laboratories for biochemistry and genetics.

## Program Regenerative Medicine

### Head and contact for inquiries:

*Dr. Ulrich Knapp, Phone: +49 7247 82-5577  
Fax: -5579  
E-Mail: ulrich.knapp@regmed.fzk.de*

### RESEARCH AREAS

- Bioreactors and cellchips,
- Tissue engineering,
- Bionic prostheses,
- Systems based on virtual reality for the planning of operations,
- Manipulator systems for use in nuclear magnetic resonance tomographs.

## Program Structure of Matter

### Head and contact for inquiries:

Prof. Dr. Johannes Blümer, Phone: +49 7247 82-3545

Fax: -3548

E-Mail: [johannes.blumer@ik.fzk.de](mailto:johannes.blumer@ik.fzk.de)

### RESEARCH AREAS

- Nuclear astrophysics,
- Cosmic radiation,
- Neutrino physics,
- Synchrotron radiation,
- Condensed matter physics,
- Grid computing.

### FACILITIES

Synchrotron radiation source ANKA, Pierre-Auger-Observatory in Argentine KASCADE-detector field to measure cosmic radiation, KATRIN for the detection of neutrino mass.

## Division Nuclear Facilities Decommissioning

### Head and contact for inquiries:

Dr. Peter Fritz, Phone: (07247) 82-2013

Fax: -2196

E-Mail: [peter.fritz@vorstand.fzk.de](mailto:peter.fritz@vorstand.fzk.de)

### RESEARCH AREAS

- Decommissioning and dismantling of old nuclear facilities,
- Decontamination,
- Conditioning of solid and liquid wastes to packages suitable for repository storage,
- State collection centre for radioactive waste.

### FACILITIES

Dismantling logistics, remote controlled disassembly of facilities, decontamination facilities, reducing the volume of and solidifying radioactive wastes for safe repository storage.

## Centre for Advanced Technological and Environmental Training

### Head and contact for inquiries:

Dr. Gunthard Metzger, Phone: +49 7247 82-4800

Fax: -4857

E-Mail: [gunthard.metzig@ftu.fzk.de](mailto:gunthard.metzig@ftu.fzk.de)

## Courses, Seminars and practical training sessions in the areas:

- Radiation protection and nuclear technology,
- Environmental protection and industrial safety,
- Natural sciences and engineering,
- New technologies, information and communication technology,
- Data processing and programming,
- Management training,
- Communication and working techniques.

### FACILITIES

Training laboratories for genetic material, radiological protection, radio chemistry and environmental analysis.

# Steinbeis Foundation for Economic Development

## Headquarters

### Steinbeis-Stiftung für Wirtschaftsförderung

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Willi-Bleicher-Straße 19  
70174 Stuttgart  
P.O. Box 10 43 62, 70038 Stuttgart  
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E-Mail: stw@stw.de  
Internet: www.stw.de

### Steinbeis Foundation Board:

Prof. Dr. Heinz Trasch  
(Chairman of the Board)  
Prof. Dr. Michael Auer

### All Steinbeis-Enterprises can be reached via our Service Numbers

Phone: +49 711 1839-777  
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## Steinbeis-Enterprises:

### AALEN

#### Applied Management

Director: Prof. Dr. U. Holzbaur  
E-Mail: stz217@stw.de  
Internet: www.stw.de/stz/217.htm

#### ARGE Metal Casting

Director: Prof. Dr. Dr. h.c. F. Klein  
E-Mail: stz41@stw.de  
Internet: www.stw.de/stz/41.htm

#### Corrosion and Working Materials

Director: Prof. Dr. T. Ladwein  
E-Mail: stz822@stw.de  
Internet: www.stw.de/stz/822.htm

#### Electrical Drive Electronics and Power Electronics

Director: Prof. Dr.-Ing. H. Steinhart  
E-Mail: stz1015@stw.de  
Internet: www.stw.de/stz/1015.htm

#### GTA Aalen Technology Foundry

Director: Prof. Dr.-Ing. L. Kallien  
E-Mail: stz825@stw.de  
Internet: www.stw.de/stz/825.htm

#### Image Processing and Applied Information Technology

Director: Prof. Dr. U. Klauck  
E-Mail: stz530@stw.de  
Internet: www.stw.de/stz/530.htm

#### IT and Business Process Management

Director: Prof. Dr.-Ing. R. Schmidt  
E-Mail: stz1149@stw.de  
Internet: www.stw.de/stz/1149.htm

#### Materials Engineering

Director: Dr. A. Nagel  
E-Mail: stz476@stw.de  
Internet: www.stw.de/stz/476.htm

#### Mechatronics

Director: Prof. Dr.-Ing. U. Schmitt  
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Internet: www.stw.de/stz/1055.htm

#### Plastic Technology

Director: Prof. Dipl.-Ing. P. Wippenbeck  
E-Mail: stz16@stw.de  
Internet: www.stw.de/stz/16.htm

#### Polymer Engineering (PETZ)

Director: Prof. Dr.-Ing. A. Frick  
E-Mail: stz466@stw.de  
Internet: www.stw.de/stz/466.htm

#### Production, Processes, Human Resources Development

Director: Prof. Dr.-Ing. V. Beck  
E-Mail: stz828@stw.de  
Internet: www.stw.de/stz/828.htm

#### Technology Consultancy

Director: Prof. Dr.-Ing. habil. G. Dittmar  
E-Mail: stz21@stw.de  
Internet: www.stw.de/stz/21.htm

#### Testing Institute for Soil Systems

Director: Dipl.-Ing. (FH) P. Strobel  
E-Mail: stz386@stw.de  
Internet: www.stw.de/stz/386.htm

### ABTSGMÜND

#### Institute for Ophthalmic Optics

Director: Prof. Dr. B. Lingelbach  
E-Mail: stz42@stw.de  
Internet: www.stw.de/stz/42.htm

### ALBERSHAUSEN

#### Marketing and Sales Management

Director: Dipl.-Ing. (FH) R. Gehrung  
E-Mail: stz196@stw.de  
Internet: www.stw.de/stz/196.htm

### ALLENSBACH

#### Quality Management in the Food Industry

Director: Prof. Dr. R. Kimmich  
E-Mail: stz487@stw.de  
Internet: www.stw.de/stz/487.htm

### BACKNANG

#### Signal Engineering

Director: Dipl.-Ing. N. Budnik  
E-Mail: stz644@stw.de  
Internet: www.stw.de/stz/644.htm



## BAD DÜRRHEIM

### Actuators and Modern Process Visualization

Director: Prof. Dr.-Ing. F.-D. Küstermann  
E-Mail: stz219@stw.de  
Internet: www.stw.de/stz/219.htm

### H.I.P. - Hydraulic Innovation Parts

Director: Dipl.-Ing. (BA) S. Schaer  
F. Schaer  
E-Mail: stz681@stw.de  
Internet: www.stw.de/stz/681.htm

## BAD KROTZINGEN

### Site Management and Business Development

Director: Dr. W. Peters  
E-Mail: stz594@stw.de  
Internet: www.stw.de/stz/594.htm

## BAD URACH

### Bioanalysis and Product Development

Director: Prof. Dr. R. Kuhn  
E-Mail: stz256@stw.de  
Internet: www.stw.de/stz/256.htm

## BADEN-BADEN

### Institute for Economic-Political Strategies

Director: Dipl.-Wirt.-Ing. S. Gaier, MBA  
E-Mail: stz898@stw.de  
Internet: www.stw.de/stz/898.htm

### Market and Communication

Director: Dipl.-Wirt.-Ing. (FH)  
G. Villinger, MBA  
Dipl.-Wirt.-Ing. S. Gaier, MBA  
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## BIBERACH

### Building and Property Industry

Director: Prof. E. Klett  
E-Mail: stz57@stw.de  
Internet: www.stw.de/stz/57.htm

### Computer Aided Technical Simulations (C.A.T.S.)

Director: Dipl.-Ing. (FH) D. Matthis  
E-Mail: stz574@stw.de  
Internet: www.stw.de/stz/574.htm

### Water Management and Hydraulic Engineering

Director: Prof. Dr. A. Nuding  
E-Mail: stz1097@stw.de  
Internet: www.stw.de/stz/1097.htm

## BILLIGHEIM-SULZBACH

### Innovation and Environment

Director: Dipl.-Ing. (FH) M. Weigler  
E-Mail: stz235@stw.de  
Internet: www.stw.de/stz/235.htm

## BINGEN

### Company Management, Organization Management, and East-West-Cooperation

Director: Prof. Dipl. rer. oec. H. Leschke  
E-Mail: stz982@stw.de  
Internet: www.stw.de/stz/982.htm

## BISCHWEIER

### Consulting of Medium-Sized Business

Director: Wirt.-Ing. W. Ludwigs  
Dipl.-Wirt.-Ing. K. Manzke  
E-Mail: stz556@stw.de  
Internet: www.stw.de/stz/556.htm

## BÖBLINGEN

### Böblingen District

Director: R. Stahl, M.A.  
E-Mail: stz887@stw.de  
Internet: www.stw.de/stz/887.htm

## BRETZFELD

### Plastic Center

Director: Prof. Dr.-Ing. A. Burr  
E-Mail: stz529@stw.de  
Internet: www.stw.de/stz/529.htm

## BUCHENBACH

### Advanced Engineering Technology

Director: Prof. Dr.-Ing. T. Tawakoli  
E-Mail: stz349@stw.de  
Internet: www.stw.de/stz/349.htm

## CRAILSHEIM

### Business and Project Coaching

Director: Dr.-Ing. W. Klapdor  
E-Mail: stz341@stw.de  
Internet: www.stw.de/stz/341.htm

## DEGGINGEN

### EAST-WEST-Joint Ventures

Director: Dipl.-Betriebswirt (FH)  
J. Raizner  
E-Mail: stz236@stw.de  
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## DENKENDORF

### Building Technology

Director: Prof. G. Fetzer  
E-Mail: stz790@stw.de  
Internet: www.stw.de/stz/790.htm

## DONAUESCHINGEN

### Biomedical Engineering

Director: Prof. Dr.-Ing. B. Vondenbusch  
E-Mail: stz214@stw.de  
Internet: www.stw.de/stz/214.htm

## DOSENHEIM

### Analytic Electron Microscopy, Biomedicine, Biotechnology

Director: Prof. Dr. M. Trendelenburg  
E-Mail: stz536@stw.de  
Internet: www.stw.de/stz/536.htm

## EBERBACH

### Logistics and Marketing Management

Director: Prof. Dr. D. Polzin  
E-Mail: stz850@stw.de  
Internet: www.stw.de/stz/850.htm

## EBERSBACH

### Building-IT Systems

Director: Dipl.-Ing. M. Bischoff  
E-Mail: stz781@stw.de  
Internet: www.stw.de/stz/781.htm

## EISLINGEN

### Innovation and Organization

Director: Prof. Dr.-Ing. J. Frech  
Dipl.-Ing. (FH) O. Brehm  
E-Mail: stz539@stw.de  
Internet: www.stw.de/stz/539.htm

## ENGELSBRAND-SALMBACH

### Product Development

Director: Prof. Dr. R. Scherr  
E-Mail: stz170@stw.de  
Internet: www.stw.de/stz/170.htm

## ENGEN

### Engineered Materials and Deformation Processes

Director: Prof. Dr.-Ing. R. Winkler  
E-Mail: stz985@stw.de  
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## ERBACH

### Computer Aided Industry (CAI)

Director: Prof. Dr.-Ing. F.-W. Winter  
E-Mail: stz448@stw.de  
Internet: www.stw.de/stz/448.htm

### Institute for Quality Management and Organizational Development

Director: Dipl.-Soz.Arb. (FH)  
D. Barwitzki, MBA  
E-Mail: stz1061@stw.de  
Internet: www.stw.de/stz/1061.htm

## ESSLINGEN

### Component Stability and Safety, Material Technology and Assembly Technology

Director: Prof. Dr.-Ing. L. Issler  
Prof. Dr. P. Häfele  
E-Mail: stz502@stw.de  
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### Computer Applications

Director: Prof. Dr.-Ing. N. Kappen  
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Internet: www.stw.de/stz/74.htm

### Heat and Flow Technology

Director: Prof. Dr.-Ing. U. Gärtner  
E-Mail: stz145@stw.de  
Internet: www.stw.de/stz/145.htm

### Information Technology

Director: Prof. Dr. J. Goll  
E-Mail: stz678@stw.de  
Internet: www.stw.de/stz/678.htm

### Metal Working and Work Organization

Director: Prof. Dr.-Ing. M. Stilz  
E-Mail: stz181@stw.de  
Internet: www.stw.de/stz/181.htm

### Powerder Varnish

Director: Prof. Dr. P. Thometzek  
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