

Implementation of Germany's Internationalisation Strategy in Research

Successful Projects for the Establishment
of Joint Research Structures with Partners
in the Asia-Pacific Research Area

2009/2010

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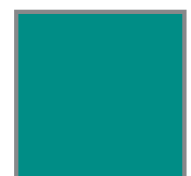
Deutsches Zentrum
für Luft- und Raumfahrt e.V.
Projektträger im DLR

Project Management Agency for the



Federal Ministry
of Education
and Research

www.internationales-buero.de



www.kooperation-international.de

Imprint

Editor



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Content

from the projects

Print

Druckerei Franz Paffenholz GmbH

Contact / Picture Credits

p. 29

Publication

November 2010

Introduction

The entire Asia-Pacific region has obtained a strong position in the world, not only from an economic and political but also from a scientific perspective.

Beyond growing prominence of individual countries in science and education, intra-Asia-Pacific cooperation is increasing steadily. This trend illustrates the region we will refer to here as the “Asia-Pacific Research Area” (APRA) is emerging globally as a third powerhouse in research and education besides Europe and North America.

While posing several challenges to Germany’s standing as a primary cooperation partner in the region, these new developments also present a wealth of opportunities for closer collaboration. However, proper implementation and beneficial use will require intensive dialogue. Therefore, the guiding principle of cooperation should be implementation of sustainable collaborations worldwide between German top universities and knowledge hubs or innovation clusters.

Germany is in an excellent position to achieve this goal. After the USA and together with France and the UK, Germany is the most important cooperation partner of APRA countries in terms of innovation indicators (like joint publications or patent applications). However, the future significance of this region will be equal to that of the USA and will eventually require even stronger results from current cooperation. Therefore, it is incumbent upon German policy to encourage and measure the exchange of students and scientists as well as the creation of partnerships in research and development, using scientific relations with the USA as an example and comparison.

To this end, the “Concept and Preparatory Measures of German Universities for the Establishment of Joint Research Structures with Partners in the Asia Pacific Research Area, APRA” were set up.

Analysis of existing funding mechanisms (conducted by the German BMBF, DAAD, DFG and the European Union) shows a significant and sustainable improvement in cooperation between German top universities and APRA partners through the funding of coordination initiatives.

Aims of this funding measure are:

- to strengthen scientific cooperation of German universities with partners in important APRA countries in selected thematic areas (natural science / technology, see German High-Tech Strategy);
- to implement structural and institutional collaborations of universities in joint research as well as initiation of research cooperation with new partners;
- to activate or extend existing cooperation in education aimed at research;
- to support German universities in the internationalisation of their research activities;
- to recruit foreign scientists and students for German universities;
- to strengthen Germany as research location, with a focus on universities; and
- to provide the basis for enhanced cooperation between Germany and the respective partner countries through stronger university cooperation in research - very successful projects could be extended to landmark projects.

The funding measure also supports German institutions in creating sustainable joint research structures together with APRA partners in the area of applied research and development (R&D).

In January 2009, a pilot initiative of the funding measure was launched. In the context of this pilot call, four projects were selected for funding. Given the positive reception and the excellence of projects selected in this pilot initiative, a second call was published in December 2009. Projects selected for funding in this second call started in mid 2010.

Table of Contents

2009

Australia

Joint German-Australian Research Group	4
--	---

China

Joint Lab: Bio-Nano Composites	5
--------------------------------	---

Japan

Mainz – Nagasaki Radiation Research Initiative	6
--	---

Singapore

DeSi-Net Rheuma: German-Singaporean Network for Rheumatology Research	7
---	---

2010

Multilateral Projects

INNO-ASIA	9
The Networked Service Society	10
Sustainable Cluster Management	11
Psychosomatic Medicine and Psychotherapy	12

Australia

German-Australian Institute for Translational Medicine	13
Research Institute for Software and Service Ecosystems – RISE	14
Water Quality in Managed Aquifer Recharge	15

China

centER – RWTH Aachen University and Tsinghua University	16
SIGENET Health: Sino-German Research Network on Public Health and Bioethics	17
Establishing Learning Communities for Application of Novel Information Technologies in Healthcare	18
Foundation of German-Chinese Research Platform SILO	19
Shanghai-Tuebingen Twin Center of Basic and Applied Life Sciences	20
Sino-German Institute on Electromobility	21

India

CoE India – Establishment of a “Centre of Excellence for Composites” in India	22
Energy-Efficient and Low-Emission Buildings in Tropical and Subtropical Outdoor Climates	23
pmIndia: Indo-German Research Center for New Media & Green Printing	24

Indonesia

Cooperation in research and education between the TU Darmstadt and the University of Indonesia	25
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Korea

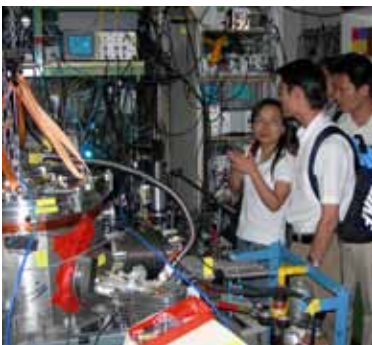
Development of common research structures in Algae Biotechnology	26
JINBiT – Joint Institute for NanoBio-Technology	27

New Zealand

IT4SE – IT for smart renewable energy generation and use	28
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2009



Joint German-Australian Research Group

Sustainable Manufacturing and Life Cycle Management

Future engineering solutions will have to provide economically, socially and environmentally sustainable products, services and processes, addressing global challenges and taking into account local capabilities and constraints to achieve a sustainable development. The Joint German-Australian Research Group “Sustainable Manufacturing and Life Cycle Management” tackles these global challenges in an international team.

Scientific Background

Products and services to ensure a high standard of living worldwide are linked to the use of natural resources, which are limited and not evenly distributed. The use of these resources is also linked to environmental impact over all stages of a product life cycle from material extraction, transport and manufacturing through usage to the end-of-life. Future engineering solutions will have the potential to address above global challenges by providing products, services and processes taking into account local capabilities and constraints to achieve an economically, socially and environmentally sustainable society.

The Joint German-Australian Research Group “Sustainable Manufacturing and Life Cycle Management” contributes to this vision with a one-stop, cradle to cradle development of technologies and knowledge along the product life cycle in a multidisciplinary and international environment.

Project and Objectives

Researchers from the “Product- and Life-Cycle-Management Research Group”, headed by PD Dr.-Ing. Christoph Herrmann, within the Institute of Machine Tools and Production Technology at the Technische Universität Braunschweig, Germany are intensively collaborating with colleagues from the “Life Cycle Engineering and Management Research Group”, lead by Assoc. Prof. Dr. Sami Kara, at The University of New South Wales, Sydney, Australia to form the Joint Research Group. The start-up phase comprises the coordination of infrastructure and standards, e.g. for measurements in manufacturing processes, and the definition of a research roadmap. The goals of the Joint Research Group are to conduct joint studies and to prepare joint publications as well as to establish research structures which are self-supporting in a long-term.



Kick-off meeting of the German-Australian research group in Sydney, 19 February 2010

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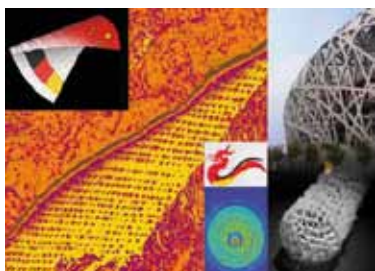
from left to right: Dr. Hans-Jörg Stähle (International Bureau of the BMBF), Prof. Dr. Thomas S. Spengler (Vice President Research and Graduates TU Braunschweig), Assoc. Prof. Sami Kara (UNSW, Head of Life Cycle Engineering and Management Research Group), PD Dr.-Ing. Christoph Herrmann (TU Braunschweig, Head of Product- and Life-Cycle-Management Research Group), Prof. Graham Davis (UNSW, Dean of Engineering), Hans-Günter Gnodtke (German Consul General, Sydney), MinR Dr. Christian Stienen (Director of Division 215 - „Cooperation with Asia and Oceania“ within the German Federal Ministry of Education and Research (BMBF)), Em. Prof. Dr.-Ing. Hartmut Kaebnick (UNSW), Assoc. Prof. Philip Mathew (UNSW)

Picture credit: IWF, TU Braunschweig

Joint Lab: Bio-Nano Composites

Biological formation of metal oxides by deep-sea organisms and application as nanocomposite materials in surgery/orthopaedics

China and Germany both are leading in the area of nanotechnology. A close cooperation in this field will help to expand their leading positions. In addition the Joint Lab Bio-Nano-Composites as scientific excellence centre contributes to the solution of global challenges (health: bone diseases as osteoporosis; environment: sustainable production of bio-materials).



Left: First evidence that bacteria and biofilms produced by them are causatively involved in the formation of manganese nodules and crusts. Right: The skeletons of glass-sponges functioned as blueprints for the birdnest-stadium in Beijing.

Picture credit: W.E.G. Müller

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Scientific Background

The exceptional ability of some marine organisms to form biosilica glass fibres and other hierarchically ordered metal oxide structures has gained much interest in nanobiotechnology and nanomedicine. In the recent years, Prof. Dr. Werner E. G. Müller and Prof. Dr. Dr. Heinz C. Schröder from the University Medical Center of the Johannes Gutenberg University in Mainz and Prof. Dr. Xiaohong Wang from the National Research Center for Geoanalysis of the Chinese Academy of Geological Sciences in Beijing discovered that the filigreed, sometimes “bird’s nest”-like skeleton of deep sea glass sponges, which consists of interwoven biosilica glass fibres, is formed by an enzyme, called silicatein. In addition, these teams demonstrated, also for the first time, that manganese nodules which are found in the deep sea are formed by a biogenic mechanism. Manganese nodules are a rich source of valuable metals such as manganese, iron, copper and nickel. Microorganisms lining the mineral surfaces within these nodules in a highly organized manner act as seeds for a biologically controlled mineralisation process.

Project and Objectives

The aim of the “Joint Lab: Bio-Nano-Composites” is to bundle the different expertises of the two countries in a joint research structure of German and Chinese partners, which also include Prof. Dr. Fu-Zhai Cui and Prof. Dr. Qingling Feng from the Department of Material Science and Engineering at Tsinghua University in Beijing. Prof. Cui is the Director of a leading group in the field of material sciences, especially biomedical material sciences in China. The main tasks will be the development of novel bone and dental replacement materials. These materials are based on biomimetic nanocomposites which are able to promote the natural biomineralisation process.

The Joint Lab is open for the participation of further partners from the APRA.

Partners

Medical Center of the Johannes Gutenberg University in Mainz:

Prof. Dr. Werner E.G. Müller and Prof. Dr. Dr. Heinz C. Schröder

National Research Center for Geoanalysis of the Chinese Academy of Geological Sciences in Beijing:

Mrs. Prof. Dr. Xiaohong Wang

Department of Material Science and Engineering of the Tsinghua University in Beijing:

Prof. Dr. Fu-Zhai Cui and Prof. Dr. Qingling Feng



Sponge spicules

Picture credit: W.E.G. Müller

Mainz – Nagasaki Radiation Research Initiative

The Mainz-Nagasaki Radiation Research Initiative is an international collaboration between the University Medical Center of the Johannes Gutenberg-University Mainz and the Nagasaki University Graduate School of Biomedical Science.

Scientific Background

In the field of radiation epidemiology and radiation biology further research is needed concerning the following topics:

- Health risk assessment in relation to diagnostic radiation exposure.
- Health risk assessment in relation to occupational low-level exposure to ionizing radiation.
- Pathogenetic mechanisms of irradiation and determinants of individual susceptibility.

Project and Objectives

The Mainz-Nagasaki Radiation Research Initiative will establish structures to support scientific exchange within research projects, personnel exchange between the partner institutions, and the development of a joint application for an international radiation research group as an instrument to conduct high-level research on radiation and health.

The scientific cooperation started its activities in October 2009. The initiative is funded by the German Federal Ministry of Education and Research (BMBF) for at least two years. A kick-off meeting took place in Mainz (January 13, 2010) in order to discuss joint research topics and the organizational structure for a collaboration of the two research partners. A joint signature of the “Memorandum of Understanding on Research Collaboration” in the dean’s office of the University Medical Center provides a formal basis to develop academic and educational cooperation and to promote mutual understanding between the two institutions.

Partners

Nagasaki University - Graduate School of Biomedical Science: Prof. Dr. Shunichi Yamashita (Director Atomic Bomb Disease Institute und Dekan der Graduate School of Biomedical Science)

Johannes Gutenberg University Mainz – Dept. Medical University: Univ.-Prof. Dr. Maria Blettner (Director of the Institute for Medical Biometrie, Epidemiologie und Informatiks)

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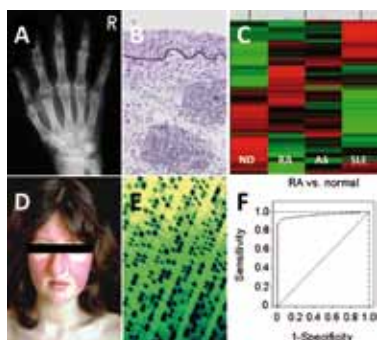
From left to right:

Univ.-Prof. Dr. Dr. Reinhard Urban, Prof. Dr. Shunichi Yamashita, Univ.-Prof. Dr. Maria Blettner

Picture credit: Peter Pulkowski

DeSi-Net Rheuma: German-Singaporean Network for Rheumatology Research

Rheumatologic disorders occur in all populations of the world. Disparities in frequency and severity between different ethnic groups have become of increasing interest and importance in the post-genomic era when searching for genetic markers and etiological pathomechanisms. In a similar way pharmacogenetic characteristics are relevant for population specific therapeutic studies in a global market of pharmaceutical products. This network aims to explore differences between European and Asia-Pacific populations in the pathogenesis of rheumatic diseases, with the long-term goal of optimizing treatments according to ethnicity and genetic background of affected individuals.



A: RA joint erosions; B: synovitis histology; C: heatmap of monocyte gene expression in healthy donors (ND), RA, ankylosing spondylitis (AS) and SLE; D: butterfly rash in SLE; E: Sequencing; F: ROC curve of a tissue biomarker.

Picture credit: DeSi-Net Rheuma

Scientific Background

Rheumatoid arthritis (RA) is the most frequent rheumatological disorder with similar frequency in many different populations of the world. In contrast, systemic lupus erythematosus (SLE) is very different in the Asian compared to the European population with a much higher frequency and worse prognosis in Asia. In recent years, genotyping and large scale transcription profiling have been performed by the partners in Berlin and Dresden. Molecular data networks and new biomarker candidates for extensive testing in different populations were established, including biomarkers that may predict response to new targeted therapies. Furthermore, standards for biobanking, cell sorting, clinical data storage and bioinformatic analysis with new algorithms for diagnostic classification were established.

Project and Objectives

The DeSi-Net Rheuma aims to establish a collaborative network with a bureau and workshops for scientific exchange. Standardized measures for data and sample acquisition will be defined. Comparative molecular analyses between European and Asian patients with RA and SLE will be performed. Other diseases may follow. The DeSi-Net Rheuma is open for the participation of further partners from Europe and the APRA.

Partners

Dept. of Rheumatology, Charité, Berlin:
 PD Dr. Thomas Häupl, PD Dr. Berthold Hoppe
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 PD Dr. Frank Pessler, PD Dr. Min Ae Lee-Kirsch
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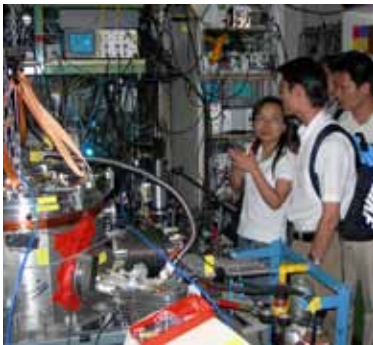
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2010



INNO-ASIA

Interdisciplinary network for holistic environment system analysis, ecosystem services, integrated modelling and sustainable resources management

The interdisciplinary network INNO-ASIA will establish cooperation structures for the development of integrated methods related to landscape and environment system analysis with focal point on climate change impacts on sustainable management of landscape resources and the use of ecosystem services.

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Meeting of the network coordinator Prof. Dr. W.-A. Flügel (in front, third person from right-hand side) with partners a. o. from Nepal and India in Mai 2010.

Picture credit: FSU Jena

Partners

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UFZ Helmholtz, Leipzig

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GDS GmbH, Jena

International Center for Integrated Mountain
Development, Kathmandu

Indian Institute of Technology, Roorkee

Indian Institute of Technology, Kharagpur

G. B. Pant University of Agriculture and Techno-
logy, Pantnagar

The Energy and Resources Institute, New Delhi

Central Soil Salinity Research Institute, Karnal

Indian Institute of Remote Sensing, Dehradun

Institute of Geographic Sciences and Natural
Resources Research, CAS, Beijing

Center for Agricultural Resources Research, CAS,
Beijing

China Agricultural University, Beijing

Charles Sturt University, Wagga-Wagga

Scientific Background

Climate change impacts are complex and show different characteristics for each landscape system. Their investigation conceptually requires a holistic system approach. Natural scientists, engineers and socio-economists will develop innovative concepts and analysis methods that allow to quantify regenerative ecosystem services on different scale levels, and to model and analyse “what-if” scenarios.

In the past 10 years FSU-Jena has developed the Jena Environment System Analysis Toolset (JESAT) for comprehensive assessment, analysis, modelling and management support of environmental systems applying a multi-scale, holistic system approach. It has been applied successfully in many IWRM related interdisciplinary projects on almost all continents. The INNO-ASIA partners will apply JESAT as a methodical analysis and development platform for:

- the development of innovative methodical concepts and tools for holistic environment system analyses,
- assessment and quantitative analysis of ecosystem services,
- integrated modelling, and
- sustainable management of land and water resources.

JESAT is based on the conceptual landscape model of distributed, process related Response Units (RU) providing model entities for the J2000 model suite within the Jena Adaptable Modelling System (JAMS). It offers applied innovative techniques from remote sensing and GIS together with the Adaptable Integrated Data Information System (AIDIS) as the environment system knowledge base for system management and decision support.

Project and Objectives

The overall project objective is the establishment of a German-Asian-Pacific network for the development of integrated methods related to landscape and environment system analysis.

In the medium term existing cooperation activities of FSU-Jena shall be consolidated with partners in the APRA, and firm and consistent cooperation structures shall be established. In the long term FSU-Jena’s research in the field of methodical development for sustainable resources management shall internationally be implemented in R&D projects together with the network partners.

The Networked Service Society

The prosperity of industrial countries is more than ever based on highly advanced services. Flexible and efficient networking of companies and public administrations is an essential prerequisite to enter and serve markets globally.

Scientific Background

The world-spanning network society is increasingly based on utilizing the recent disruptive innovations in information technology (IT). Against this backdrop, the Networked Service Society project is focused on thoroughly analyzing the interplay between service networks and IT as well as advancing three flourishing areas of Service Science: Professionalization, Digitalization, and Sustainability.

Project Objectives

The top objective of the project is to establish and broaden long-term research structures with the Asia-Pacific region to study and advance service research in all three areas. For this purpose, long-term research visits will be conducted to cooperatively publish papers in journals and conference proceedings. Also, workshops will be hosted to attract additional partners. We strive to jointly apply for subsequent research projects to further enhance the quality and scope of our cooperation.

The research goal is to contribute innovative theories and IT artifacts to the body of knowledge in Service Science. Theories are generalized insights that have been subjected to rigorous testing. IT artifacts are constructs, models, methods, and software implementations that can be utilized to launch and operate service networks.

Project Partners within the ERCIS

The European Research Center for Information Systems (ERCIS) is a network of researchers who conduct cooperative research in the field of integrated information systems development and organizational design. Within the institutionalized network of the ERCIS, core issues investigated in the discipline of Information Systems research are purposefully interrelated with Computer Science, Business Administration and Law perspectives. The project partners are :

- University of Münster (WWU), Department of Information Systems, Münster, Germany: Prof. Dr. Jörg Becker
- Queensland University of Technology (QUT), Business Process Management Group, Brisbane, Australia: Prof. Dr. Michael Rosemann
- Korea Advanced Institute of Science and Technology (KAIST), College of Information Science & Technology, Seoul, South Korea: Prof. Jin Hyung Kim, PhD
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Service Research at the
European Research Center for Information Systems



Knowledge for the Networked Service Society

Picture credits: University of Münster, ERCIS

Sustainable Cluster Management

Research-based innovation in energy and environmental efficiency through sustainable cluster management in production and logistics

The aim of the project is the development of a sustainable research network for innovative solutions to increase energy and environmental efficiency through sustainable cluster management in production and logistics. The project focuses thematically on value-added processes in port areas and hinterland corridors. At the forefront are the cooperative solutions within the region and the chain in the meaning of cooptation (simultaneous cooperation and competition). The participants are mainly based in the Pan-Beibu Gulf region emerging around the Pan-Beibu Gulf which acts as an important hub connecting China and the ASEAN countries.



Ocean freight port

Picture credit: Schenker Deutschland AG

Scientific Background

A sustainable resource-efficient regional development is expressed not only in an economic growth and international exchange of goods. The efficiency means today to be perceived and accepted as an innovative value-added partner in international supply chains. The ecological and economic limits are the most reflected in infrastructure requirements within dynamic economic and scientific regions in emerging markets. For the competitiveness and sustainable development of these regions is crucial to what extent it succeeds to link regional development, value-added processes, hinterland transportation and innovation. The approach of a cluster management for this objective requires a systematic anchoring and must take into account the regional economic characteristics.

Project and Objectives

The realization of the cluster management is carried out by a transnational research infrastructure, first based on a research group and then on a long-term institutionalized research association in cooperation with the research and transfer partners. An exchange of scientists and the realization of international workshops are also planned. In addition a communication platform for the research association will be set up. Furthermore, a web-based, cooperation-oriented communication, collaboration and learning platform will be developed for all involved partners.

Partners

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Psychosomatic Medicine and Psychotherapy

Progress through East-West Exchange

Propagation of psychic and psychosomatic disorders is causing a substantial rise in public health sector spending worldwide. Many Asian countries are particularly severely affected due to great cultural and social changes in modern society. Researchers from Germany, China, and Vietnam are conducting transcultural research studies on combining Western psychosomatic treatment and psychotherapy with Eastern medicine in an effort to gain new insights for the treatment of psychosocial diseases.

Scientific Background

Psychic and psychosomatic disorders such as depression, anxiety, and somatoform disorders have become the most frequent non-lethal diseases. Studies show a very high prevalence of psychic diseases. In China, for example, prevalence rates range from 30 to 50 percent for patients visiting a hospital. This makes early diagnosis and effective treatment exceedingly important.

The Medical Center of Freiburg University in Germany (Prof. Wirsching, Prof. Fritzsche) is very experienced not only in treating such diseases, but also in qualifying medical professionals through an internationally approved training curriculum. Prior research studies in cooperation with Chinese and Vietnamese partners have shown a number of important cultural similarities and differences in, among others, doctor-patient communication, diagnosis, and treatment approaches. Integration of Eastern medicine like traditional Chinese medicine may provide important new impulses, for instance, for research development in the treatment of somatoform disorders and pain.

Project and Objectives

This project will be conducted as a series of transcultural research studies. Medical professionals in China and Vietnam will be trained in the field of psychosomatic medicine and psychotherapy. Research focuses mainly on epidemiology, concepts of the disease, psychological factors for diseases, and on a comparison of various treatment methods.

This project aims to establish a German-Asian research network and to develop integrative, multimodal treatment methods for psychosocial diseases. Besides enriching psychosomatic medicine and psychotherapy, this project may also contribute to the improvement of public health systems in countries where rapid cultural and social transformations are taking place.

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Hue College of Medicine and
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University of Medicine and
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Vietnam: Prof. Dr. Ngo Tich Linh



Picture credit: Tongji University, China

German-Australian Institute for Translational Medicine

Transferring knowledge of complementary translational research approaches of preventive diagnostics from bench to bedside



Further Information:

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 Prof. Dr. med. S. R. Bornstein
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Modern laboratories used by the GAITM
 Picture credit: private

Partners

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John Curtin School of Medical Research, The Australian National University, Canberra:
 Prof. Julio Licinio (MD)

The Baker IDI Heart and Diabetes Institute, Div. of Hypertension Thrombosis and Vascular Biology, Melbourne:
 Prof. Murry Esler, MBBS, PhD

Scientific Background

The future of our modern health care system will be the effective translation of clinical and basic science. The main focus of the Medical Faculty at the Technische Universität Dresden (Dresden University of Technology) is translation of research approaches in the areas of prevention and regeneration. The John Curtin School of Medical Research of the Australian National University in Canberra focussed their research on individualized pharmacogenomic and predictive medicine. Therefore, it is mandatory to cooperate with such an ideal partner in the Asian-Pacific region to develop a binational Institute for Translational Medicine.

Both partner cities are represented by a similar structure and alignment of their health care systems and exhibit an ideal complement model of the European and Asian-Pacific population structure of this important prospective Australian area. Furthermore the scientific focus of both institutions represents an ideal complementary structure for the installation of a world wide institute of this future topic.

Project and Objectives

The concept is based on the assumption that problems of modern health care systems with regards to the increasing epidemic diseases like diabetes, obesity, hypertension, dementia and depression in both regions can only be solved in a satisfactory way using a translational approach.

The institute will enable us to understand and treat not only the global dimension of these problems but it is also the basic prerequisite for the development of significant predictive and pharmacogenomic approaches. Based on the population development the Asia-Pacific region is the most important region but lacks the embedding of translational approaches, therefore the individual measures will focus on three topics:

1. Translation of new selective strategies for the detection of diseases out of our present work;
2. Design and development of common longitudinal cohort-studies at both sides;
3. Definition of the social dimension of translational medicine in both culture areas.

Research Institute for Software and Service Ecosystems – RISE

During a period of two years the project aims at strengthening the existing collaboration by joint research, workshops, and research visits between Mannheim and Brisbane. The project partners intend to set up a research institute to advance the topic “Software and Service Ecosystems” and plan to integrate additional research partners of the Asia-Pacific region. The synergies that arise from these mutual interests and complementary capabilities can be utilized effectively since the research interests overlap in the topics of business processes, services, and software systems. As a common platform for the consortium a research institute is established – RISE.

Scientific Background

Nowadays, services play a key role in modern economies, and a good portion of service value creation would not be possible without modern information technology and systems. For example, the ubiquity of the World Wide Web shows that information technology is the key driver for innovative solutions and business models.

Recently, there has been a paradigm change emphasizing the flexibility and the service orientation of information systems. Thus, the traditional software supply chain is slowly replaced by a complex network structure (“ecosystem”) where the provision and development of IT services is decentralized. Hence, these ecosystems are the center of mutual research for which all research partners provide their particular expertise.

Project and Objectives

The primary focus of the project is the establishment of a long-term and sustainable cooperation of the involved participants. Existing structures will be extended and strengthened. Thus, joint research of all partners with the topic “Software and Service Ecosystems” will be made possible in addition to the already established co-supervision of diploma and master theses.

The RISE institute will serve as a collaboration medium, providing a platform and being responsible for public relations. The involvement of industry partners in Germany as well as in the Asia-Pacific region will facilitate the realization of case studies and research projects in the network. The establishment of this institute aims at fortifying the strategic research cooperation. In the middle-term, the partners work towards attracting additional third-party project funds, which will be optimally integrated into the research parties’ topics.

Accompanying the project, workshops and information days will be organized in order to inform other areas of the universities about relevant research outcomes. Finally, RISE research will be promoted to the academic community by jointly conducted workshops or conference tracks related to „Software and Service Ecosystems“ on an international level.

Partners

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Chair in Information Systems III
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ogy, Information Systems Disci-
pline, Business Process Manage-
ment Group
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Picture credit: University Mannheim, Project RISE

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Water Quality in Managed Aquifer Recharge

Temporal storage of water in the underground becomes increasingly important in arid and semi-arid regions, where it contributes to a sustainable water management (e.g. Australia, USA, Arabian Peninsula). One aspect of the project is the advancement of monitoring methods in the field of molecular biology and analytical chemistry together with the scientific institutions in the partner country Australia. Furthermore the elimination of trace organics and hygienically relevant microorganisms will be investigated in laboratory and field experiments, thereby broadening the understanding for these processes and finally incorporating the findings into reactive transport models.

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Laboratory set-up for testing the elimination of trace organics and pathogenic microorganisms during soil passage

Picture credit: Dr. Andreas Tiehm, DVGW Technologiezentrum Wasser (TZW)

Scientific Background

Emerging pollutants are substances that attract increasing awareness due to their observed persistence in the water cycle. Among them are pharmaceutical residues, X-ray contrast agents, but also synthetic hormones and xenobiotics with endocrine disrupting effects. The detection of these anthropogenic trace organics takes place via physicochemical methods (HPLC, GC) or in vitro bioassays. The monitoring and successful elimination of pathogens during soil passage and underground storage is a key factor in water quality and an integral part of ongoing scientific research. The joint advancement of detection methods (biomolecular and culture techniques) is part of the project. Natural attenuation processes during soil passage and aquifer storage can contribute to the elimination of micropollutants as well as hygienically relevant microorganisms. In order to obtain more insight into the processes during soil passage, soil column studies will be carried out under saturated and unsaturated conditions and different temperature levels (see figure). The key processes will be simulated in a reactive transport model using PHT3D, based on the combination of a numerical groundwater model with the geochemical equilibrium model PHREEQ-C.

Project and Objectives

Due to its population density Germany has long-standing experience with treated wastewater in natural and engineered water cycles whereas Australia is currently one of the world leaders in the large scale application and design of Aquifer Storage and Recovery schemes, providing key input to international regulations and guidelines for Managed Aquifer Recharge.

The scientific exchange between the partner countries is focused on the following topics:

- Advancement of analytical methods
- Elimination of pathogenic microorganisms
- Elimination of contaminants incl. emerging pollutants
- Process understanding using reactive transport models

Therefore, field-sampling campaigns and laboratory experiments will be carried out and the samples will be exchanged between the partner countries. Long-term studies on biochemical elimination processes will be initiated.

Partners

Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

Karlsruhe Institute of Technology (KIT), Germany

DVGW Technologiezentrum Wasser (TZW), Germany

centER – RWTH Aachen University and Tsinghua University

For many years RWTH Aachen University has trustfully worked together with the internationally renowned Tsinghua University in Beijing in many fields. Under these auspices, the Institute for Environmental Engineering of RWTH Aachen University (ISA) has co-operated very successfully with the Department for Environmental Science and Engineering (DESE) for more than 12 years. It has been consistently the policy of ISA and DESE to establish a common environmental research structure.

Scientific Background

With the newly founded Aachen University - Tsinghua University Center for Advanced Environmental Research and Engineering (centER) we succeeded to initiate substantial joint research activities. This implies in particular that German researchers also benefit from an improved access to Chinese research projects and results. Thus, the main objectives of the project centER are:

- Strengthening the environmental research infrastructure at both institutions and joint result dissemination
- Expansion of scientific exchange and training of young scientists
- Further and new development of joint research approaches/issues
- Acquisition of third-party funds of relevant national and international donor organisations

In the early stages of this project, an office infrastructure will be implemented at DESE and ISA in order to host the project co-ordinator and visiting scientists. Furthermore, the visiting scientists will get full access to the existing workshops, test facilities and laboratory capacities in Aachen and Beijing to carry out the forthcoming joint research work. To ensure that the full range of environmental research topics will be covered, other institutes or other universities will be involved in the binational research structure. Worldwide significant environmental problems remain to be solved in both urban and rural areas. Nonetheless, the environmental problems in China may be classified much more serious in comparison to those in Germany.

Project and Objectives

- Implementation of basic and practical research
- Implementation of multidisciplinary research approaches - in particular to improve management and processes in the environment in China
- Development of innovative environmental technologies and optimization of process technologies
- Concept design and system optimization: e.g. development of appropriate decentralized supply and disposal infrastructure for rural areas in China.

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Chinese partners visiting german environmental technology.

Picture credit: Chair and Institute for Environmental Engineering RWTH Aachen (ISA)

SIGENET Health: Sino-German Research Network on Public Health and Bioethics

Assessing Cultural Principles for Health: Solidarity, Justice, Responsibility

Research on Public Health and Bioethics addresses interdisciplinary interfaces of human, social and natural sciences. International collaboration faces different communication standards, anthropologies and approaches to ethical governance. The ongoing globalisation and China's transformations call for increased scientific scrutiny and present new opportunities for interaction. There lies a huge and, as yet, underdeveloped potential for mutual benefit in the collaborative research of these interplays.



Picture credit: International Bureau of the Federal Ministry of Education and Research

Scientific Background

The building of a German-Chinese Research Infrastructure in Public Health and Bioethics takes up existing collaborations between German-speaking and Chinese partners, with the goal to advance sustainability, scientific merits and understanding, in particular regarding translational issues. It will use target projects to develop a durable institutional network, and to further communication skills and trust across cultures.

Standardisation and translation are key challenges in international collaborations. They raise philosophical, cultural, organisational, legal, ethical, communicative and technical questions. They demand advanced theory as well as empirical substance. First, China and Germany should know more about each other. We will provide an overview about the relevant state of the art on both sides, as a point of departure, and jointly develop a research agenda. The SIGENET will target central concepts of health anthropology and ethics, with comparative and evaluative analysis. It will focus on procedural and institutional aspects of regulatory practice, e.g., ethical review and "informed consent", and how they can be translated and dealt with between cultures. It will generate sociological data on attitudes towards utilisation of the body and on Professionalism, e.g., in areas of Regenerative Medicine and Biobanking. The initial phase of the SIGENET is designed to draft jointly a sustainable research agenda and set up the institutional requirements to advance Sino-German collaborations.

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Prof. G. Lindemann: Oldenburg University
PD. Dr. D. Niese: Novartis Pharma, Basel
Prof. H. Roetz: Bochum University
PD Dr. T. Spranger: Bonn University
Prof. P. Unschuld: Charité-Medizin, Berlin
Prof. P. Wiedemann: Technology Institute, Karlsruhe
Prof. K. Zatloukal: Medical University, Graz

Project and Objectives

- Establish a headquarter to coordinate the emerging joint research program, build a communication platform, organise regular work shops and integrate related research activities
- Conduct an exchange program for research fellows
- Lay out common normative standards in science, methods and best practice for health and biotechnology (base for understanding in culturally sensitive areas)
- Develop a joint research agenda and a continued education plan
- Establish sustainable formats for studies and research in public health, life sciences and bioethics
- Set up an internet-based platform and a data base to support cooperation and joint publications
- Initiate and host the process of communication
- Initiate and orchestrate a series of pilot studies

It should be noted that this is an open project that can be joined by like-minded colleagues and institutions.

Establishing Learning Communities for Application of Novel Information Technologies in Healthcare

In healthcare, novel information technologies are widely regarded as key elements in the expected transformation of the industry to face changing demographics, increasing service expectations, increasing labour cost and the threat of fraud. This expectation is based on the power of information technologies to link diverse stakeholders in integrated, open information infrastructures. However, our research on inter-organisational information systems (IOIS) has shown that evolution of such infrastructures is barely understood. In the quest to make a reality of the e-health concept of widely used, open information infrastructures, it is important to understand the dynamics of this evolution so the appropriate policy settings might be devised.

Scientific Background

As part of an international comparative research project on the structure and evolution of inter-organisational information systems (IOIS) in pharmaceutical distribution which began in 2004 and is still ongoing the idea of the Learning Community was developed. This idea reflects on our findings that IOIS must be understood as socio-technical structures that evolve as part of practices which, in their routinized day-to-day activities must maintain these systems through myriad and manifold activities. Moreover, a major finding of our research is that IOIS are surprisingly resistant as well as malleable, i.e. they maintain their identity over long periods of time, typically several decades, while also adapting to changing environmental conditions. One implication is that efforts to 'implement' or 'develop' an IOIS must take into account that these systems are never created from scratch but evolve from an existing installed base. From this perspective, many failed IOIS implementation projects can be seen as cases in which the intervention was rejected through the effects of an as yet poorly understood evolutionary mechanism. To shed light on this mechanism a longitudinal approach is required. The instrument of the Learning Community provides the research environment for such a study.

Project and Objectives

The direct aim of this research consists of establishing a Learning Community as a novel research infrastructure with a time horizon of ten years for strengthening the existing cooperation between the partners. We anticipate that this research will contribute to (1) the successful development of open information infrastructures in healthcare; (2) the understanding and establishment of a novel research instrument (Learning Communities) for the longitudinal study of information systems; (3) the understanding of the interaction of institutional and technical factors in the transformation of industries.

Partners

The School of Economics and Management has established itself as one of the leading business schools in China. Founded in 1984 at the prestigious Tsinghua University, it has quickly developed a high profile, mostly through extensive collaboration with leading North-American business schools such as Sloan School of Management at MIT and Harvard Business School. The Faculty of Business and Economics at RWTH Aachen University has been founded in 1985 and since developed a profile of a technically oriented business school with a science-oriented style of teaching and research.



Prof. Dr. Guoqing Chen (right) and Prof. Dr. Kai Reimers (left)

Picture credit: Prof. Dr. Kai Reimers

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Foundation of German-Chinese Research Platform SILO

The wbk Institute of Production Science at the Karlsruhe Institute of Technology (KIT) started intensive project activities in China since 2005. Through these projects, a large number of contacts with research facilities, training providers and industrial enterprises in China have been obtained. It led to the foundation of the research program GAMI (Global Advanced Manufacturing Institute) in early 2009, which was strategically positioned by wbk as Chinese research section. The research project SILO (Chinese „Silu“ for „silk road“) provides the structural preconditions for building a global research, project and training platform.

Scientific Background



Germany is closely bonded with China as a country of origin of many multinational production-technical enterprises. China is a location of new production sites of German enterprises, a place of manufacturing enterprises in many world markets and the starting point of emerging competitors. The networking between German and Chinese companies will be continuously enhanced in the future. To achieve a win-win situation and meet common global problems such as energy efficiency, the strategic alignment of companies, the expansion of German values to the supply chain and dealing with company know-how is particularly important.

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Project and Objectives

The aim of the research project SILO is the structural setup of German-Chinese research platform SILO and the development of research, project and training activities in production-technical field in China. In this context, a new organizational and legal infrastructure is necessary to secure the long-term commitment in China and the cooperation with Chinese researchers, which is coordinated by the German side to establish a legal structure in China. These issues will be implemented in cooperation with Chinese universities and international (German and Chinese) enterprises.

Partners

wbk Institute of Production Science,
Karlsruhe Institute of Technology, Germany

Advanced Manufacturing Institute (AMI), Hong Kong UST

Chinesisch-Deutsches Hochschulkolleg (CDHK),
Tongji University Shanghai



Industrial production of automobiles

Picture credit: MEV Verlag GmbH, Augsburg

Shanghai-Tuebingen Twin Center of Basic and Applied Life Sciences

Shanghai is an ideal place for life science research, because of the high density of pharmaceutical industry and academic research potential. Based on several partnership agreements, a vivid research, training and exchange program will be initiated. Student exchange, workshops and student funding has already been established and bioinformatics is currently a driving topic. Neurosciences, notably drug development in inflammatory diseases of the CNS and PNS, constitute another major program and further topics will be added according to excellence and available funding.

Scientific Background

The initiative is drawing much interest from Asian and other countries and students and scientists from South Korea, Iran and Nigeria are already participating in the nascent programs. Thus, multilateral activities will significantly contribute to this project. We strongly favor participation of SMEs in this project and we will provide the flexibility to incorporate suitable topics. Further, we strongly welcome partners from APRA for joint scientific programs and training of young investigators.

Based on partnership agreements, an exchange and training program of scientists and students from bioinformatics, neurosciences and medicine has been established.

Computational biology covers a large area of expertise, from population genetics to biometrics, image analysis and drug development, notably in inflammatory and degenerative processes of the CNS and PNS.

Project and Objectives

The Twin Center will develop and promote academic and applied life science programs in Shanghai and Tuebingen. Exchange of academic staff and students between the institutions, workshops and funding will be coordinated. SMEs will be recruited into the network. Particular emphasis will be placed on development and funding of binding and lasting academic or other organizational structures.

Partners

Shanghai Institutes of Biological Sciences (SIBS), Chinese Academy of Sciences (CAS)

Tongji University, Shanghai

University of Tübingen, Germany

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Emblem of Tongji University: sitting in one boat and "working hard together" or simply "surviving".

Actually, international collaboration is a matter of survival to the economy.

Picture credit: Tongji University, Shanghai

Sino-German Institute on Electromobility

Due to the lack of fossil fuels and the possibility to reduce CO₂ emission, the development of climate friendly electric vehicles and a change to sustainable electromobility within the next years are necessary. Also in China electromobility is a main issue; besides the environmental protection and an enhanced quality of life, future economical and industrial aspects of this key technology play important roles. Therefore, the Chinese government increasingly supports innovative projects on electromobility. With its excellent fundamental research in the field of electrochemistry and physical chemistry, its enormous technological potential within the engineering sciences and the strong connection to well-known industrial enterprises the Technische Universität München has the opportunity to obtain a strategically favourable and synergetically beneficial position in China.



Signing ceremony of the joint agreement which was signed by the presidents of both universities Prof. Herrmann (TUM) and Prof. Hu (THU) in the presence of the Bavarian prime minister Horst Seehofer and the German ambassador in China, Dr. Michael Schäfer

Picture credit: Tsinghua University Beijing (THU)

Scientific Background

The expertise of the joint institute will rely on research and development of electrochemical energy technologies with focus on electromobility. Research alliances between the TU München (TUM) and the Chinese partner university, the Tsinghua University in Beijing (THU), will extend from fundamental research in the field of applied and technical electrochemistry over mechatronics, energy conversion and storage, up to automotive engineering in order to cover the whole spectrum of electromobility. However, there are several questions to be answered before electric vehicles become normality: How can the charging time of batteries be reduced? How can batteries store more energy? How can electric vehicles be integrated into smart grids? Can fuel cells be used to switch between the combustion engine and the electric motor while driving?

Project and Objectives

In its beginning the joint „Sino-German Institute on Electromobility“ will combine the potential of both universities in the fields of fundamental research such as physics, chemistry and materials science. Since electrochemical energy storage devices are important key components in electric vehicles, first cooperation projects will focus on battery and fuel cell technology, as well as on supercapacitors. For their technical application safety, power efficiency and long term stability are still challenging issues. Therefore, projects will also be extended to such applied research topics of electrochemistry already in an early stage of the joint institute. Moreover, it is planned to gain further collaboration partners among German and Chinese universities, as well as German and Chinese industry. Especially German automotive manufacturer and supplier, that are already present in China, should be included in the joint “Sino-German Institute on Electromobility”. With the signing of the agreement (see picture) the base of the joint institute and therefore, best conditions for a fruitful cooperation could be established.

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Picture credit: Technische Universität München

Partner

Tsinghua University Beijing (THU), China

CoE India – Establishment of a “Centre of Excellence for Composites” in India

The goal of this project is to establish a Centre of Excellence for conducting cooperative research and education between Germany and India in the field of Composites. India is of high interest for research in the field of composites as the global challenges for sustainable mobility and energy generation must be solved due to its growing and increasing affluent population. Innovations in these fields are growing in the emerging markets and must be adapted to the respective conditions. Automotive and Aerospace industries are already strong in India. Also, India is one of the growing markets for wind energy. World’s leading companies are manufacturing wind turbines in India which has resulted in a significant growth of the composites sector in India.

Scientific Background

A partnership with India is of special interest for Germany. The project CoE India is an outcome of the initiative “India and Germany - Strategic Partners for Innovation” from BMBF. In the framework of the project “Lite Net India” a strategic concept was developed to establish a cooperative Centre of Excellence for Composites in India.

At the Karlsruhe Institute of Technology the Institute of Vehicle System Technology (FAST) is involved in the product development and simulation of composites. FAST is working together with Fraunhofer Institute for Chemical Technology (ICT) and other partners in the innovation cluster “KITE hyLITE – Technologies for hybrid lightweight construction” for the development of production processes for structural components in hybrid construction. The cooperation between KIT and ATIRA will focus basically on the development of application using textile-reinforced composites that are manufactured using injection processes, e.g. RTM (Resin Transfer Moulding). During the scope of the CoE India project the structure for collaborative research will be established with ATIRA and as well as other R&D institutes from India to develop new applications based on fibre reinforced composites.

Project and Objectives

1. Establishing a test laboratory for composites

A testing laboratory for composites will be established according to the international standards. The test standards will be developed according to conditions in India.

2. Establishing a design centre for composites

A centre for product development and simulation will be built in Ahmedabad in which the components and the methods can be developed for the Indian market. Additionally it will also serve to educate the students as the Centre of Excellence will also offer a cooperation platform for teaching.

3. Screening and evaluation of production processes

Different production processes for fibre-reinforced composites will be studied to evaluate their relevance for the Indian market. In the further scope of the cooperation the relevant production processes for fibre-reinforced composites will be established in Ahmedabad.



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Partners

Karlsruhe Institute of Technology (KIT), Germany

Ahmedabad Textile Industry’s Research Association (ATIRA), India.

Energy-Efficient and Low-Emission Buildings in Tropical and Subtropical Outdoor Climates

As energy costs rise, so does the importance of energy consumption when the building is in use, not only as a cost factor but also with regard to CO₂ reduction. Whereas the predominant cause of high costs and CO₂ emissions in countries of the northern hemisphere is heating costs, in countries with comparatively high mean temperatures it is primarily the energy required for cooling the buildings.

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Partners

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Indian Plywood Industries Research & Training Institute (IPIRTI)

Indian Institute of Technology (IIT), Roorkee

Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI, Germany



Insulation with renewable primary products (hemp, wood and cellulose fiber)

Photo credit: HNE Eberswalde

Scientific Background

With 6.7% growth in the 2008/2009 financial year – and averaging 8.8% over the last five years – India is, after China, the world's fastest expanding economy. Over the next few years a total of \$500 bn. is to flow into infrastructure projects, also including the long-term promotion of a modern approach to the design of industrial and residential buildings. Demand for materials on the part of the construction sector and associated industries will be correspondingly high.

In particular, in various sources of information as well as the applicants' own experience testify to the extremely poor designs of façades and buildings from the building-physics point of view. This is even true for large office and administration buildings of modern architectural design. By central European standards the energy losses occurring under subtropical to tropical climatic conditions as a consequence of inadequate insulation are immense. This aspect is the point of departure for identifying joint research possibilities for reducing both CO₂ emissions and primary energy consumption and implementing these in specific individual projects.

Project and Objectives

- Establishment of long-term research structures between Indian and German partners for investigating questions and problems of relevance to a more effective use of renewable raw materials in the building sector while taking into consideration their regional availability and suitability for building envelopes optimized from the building-physics point of view.
- Setting up a database for climatic data relating to the micro-environments around buildings as well as inside buildings in India.
- Preparations for the planned establishment of testing and inspection facilities for building materials based on renewable raw materials and their end products (components) in order to lay down international standards for products (building physics, emissions).
- Joint training of Indian partners not only in effective and environmentally friendly building but also in testing relating to relevant building-physics properties including emissions.
- Joint preparation and optimization of a building-physics problem definition focusing on 'Heat insulation and climate control' with the aim of producing efficient and energy-optimized building envelopes using insulating materials preferably made from renewable raw materials.
- Assessment of the potential which the raw materials available in India have for the production of building materials made from renewable resources.

pmIndia: Indo-German Research Center for New Media & Green Printing

Under the name of pmIndia, the Institute for Print and Media Technology at Chemnitz University of Technology (pmTUC) is conducting different activities in education and research in India. As part of this initiative, a joint double degree Master's programme in the field of Printing & Media Engineering was launched together with Manipal University (Karnataka, India) in 2008, which is attracting more and more interest. The next step will be a research and training center for the Indian printing industry in Manipal, India, which will be established in close cooperation with Manipal University.

Scientific Background

The pmTUC is a leading and internationally accepted research and education institution in the area of printing and media technology. It is successfully linking the research field of printing press engineering with electronics and media technology. It is especially in the field of printed electronics that the pmTUC was able to establish a global leading position.

The print market in North America and Europe is stagnating on a high level, but the dynamic of growth has shifted unstoppably towards Asia. Especially in future markets, such as India, the conventional print market is growing at the same speed as the market for electronic media. In addition, German companies provide approximately 70 percent of the world's conventional printing technology and Germany's reputation in the field of printing engineering is excellent all over the world.

Project and Objectives

The project aims at establishing a modern technology and training centre for the Indian printing industry in Manipal. Equipped with state-of-the-art technology, the centre shall serve as model for sustainable, energy- and resource-efficient, high quality print production.

With regard to research, the project focuses on promising areas of printed electronics. Special emphasis shall be put on mass-printed photovoltaics – a technology that is very attractive for the Indian mass market. There are already several Indian partners who have shown great interest in this topic.

In the initial phase of the project, the main focus is on the development of implementation strategies for the innovative field of printed electronics, especially printed photovoltaics. Application-, infrastructure- and market-oriented projects based on a decentralized, low-investment strategy shall be initiated in Manipal.

Partners

Chemnitz University of Technology, Institute for Print and Media Technology, Chemnitz (Germany)

Manipal University, Manipal Institute of Technology, Manipal (Karnataka, India)



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The Indian Bachelor student Taslim Khan already had the possibility to get to know German research work during a joint project with the Koenig & Bauer AG

Picture credit: Koenig & Bauer AG



Cooperation in research and education between the TU Darmstadt and the University of Indonesia

The cooperation in research and teaching to train after Humboldt's principle of "alliance of research and education" to make teaching and research on an internationally comparable level, exists between the Chair of Waste Management of the Institute IWAR (Institute for Water Supply and Groundwater Protection, Wastewater Technology, Waste Management, Industrial Material Cycles, Spatial and Infrastructure Planning) at the Department of Civil Engineering and Geodesy of Technische Universität Darmstadt (TUD) and the Environmental Study Program of the Department of Civil Engineering of the University of Indonesia (UI). The Chair of Waste Management of the Institute IWAR of the TUD is represented since 1992 by Prof. Dr. Johannes Jäger.

Further Information:

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Scientific Background

In Indonesia, especially in urban areas, since the administrative decentralization law of 2000 an urgent and great requirement for young scientists/-engineers is needed who can develop and carry out together with the makers sustainable waste management and climate change strategies in the municipalities.

For this reason, in September 2010, a Master's program in Environmental Engineering was launched. Advantages, such as the location of the campus and the existing contacts between the partners and the region Depok (Greater Jakarta) can it make sense Depok choose to appear as a model region for waste technology research and development.

Project and Objectives

Since 2009 one from the German Academic Exchange Service (DAAD) funded cooperation (Subject-related partnership with universities in developing countries) exists on the Teaching of Environmental Engineering.

„Development of All-Round Solutions for the Waste Management System and an Educational Program in Depok, Indonesia“

- Implementation of a Double-Degree Post Graduate Program
- Exchange of students, professors, lectures and researchers
- Development of a joint research group with the focus of waste management and technology such as climate change at the University of Indonesia



Partners

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Development of common research structures in Algae Biotechnology

The Institute of Biotechnology of the Berlin University of Technology (TUB) and the Department of Food and Biotechnology, Dongseo University (DSU) in Busan/South Korea have had intensive cooperation for over ten years in the field of education (see photo). The Department of Microbiology and Genetics of the Institute of Biotechnology of the TUB now intends to expand this existing cooperation by establishing a sustainable cooperation structure in research supported by the BMBF program (German Federal Ministry of Education and Research).

Scientific Background

The basis of this cooperation will be “Algae Biotechnology”, a field of biotechnology with tremendous potential. The basic idea is to combine the skills of both partners, the molecular biology know-how of the German lab and the traditional great wealth of experience in fermentation of naturally occurring algae in South Korea. The declared goal is to unlock the full scientific and technical potential of algae as a source for production of high value substances.

For many years the Department of Microbiology and Genetics of the Berlin University of Technology has been working successfully in the field of molecular biology and the optimization of microorganisms. The optimization process involves both targeted modification of genetic make-up and metabolic pathways (“metabolic engineering”), respectively. The Department of Food and Biotechnology of the Dongseo University in South Korea has concurrently been working for a long time on product orientated fermentation of micro algae and the development of algae bioreactors. At present only a relatively low number of algae species are in technical use, although the biotechnological potential of this group of organisms is extremely high in many commercially interesting areas such as nutrition, health or cosmetics. Therefore, we think it is a promising strategy to combine the skills of both the German and the Korean labs to further develop and optimize fermentation technology and the organisms of choice to result in the production of substances of high value.

Project and Objectives

- Establishing a lab for genetic optimization of micro algae in the new Research Center for Biotechnology at the Korean university
- Elaboration of a common research strategy that fulfills the needs of both partners
- Elaboration and submission of common proposals for third party funding
- Establishment of a common research group and bilateral exchange of scientists
- Cooperation with industry in the Busan area
- Improvement of the biotechnological education program at the Korean university



Further Information:

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Signing ceremony for the Dual Bachelor Agreement of the Biotechnology program between TUB and DSU in 2009.

Picture credit: Dongseo University (DSU), South Korea

Partners

Berlin University of Technology (TUB), Institute of Biotechnology, Department of Microbiology and Genetics

Dongseo University (DSU), Division of Energy and Bioengineering, Department of Food and Biotechnology, Busan/South Korea

JINBiT – Joint Institute for NanoBio-Technology

JINBIT is an international collaboration between the Center for Nanotechnology (CeNTech) of the University of Münster and the Gwangju Institute of Science & Technology (GIST), Department of Nanobio-Materials and Electronics (DNE), the latter being part of South Korean World Class University (WCU) program. JINBiT aims at the founding of a joint virtual Institute for NanoBio-Technology.

Further Information:

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Scientific Background

Inflammation is an integral part of many healing processes and, thus, a directed and well-tuned physiological aspect of the body’s healing. It may, however, flare out of control and develop to a disease itself. Undetected primary inflammation may also cause secondary diseases like cancer or heart diseases. Timely detection of inflammatory events is for the treatment and prevention of this disease of great practical interest.

Project and Objectives

The scientific objective of the project is the development of biochips for early detection of inflammatory processes and single cell studies using nanoanalytical tools. The project will establish collaboration labs each within the two host institutions countries.

These laboratories will be complementary and will serve students and staff members from the partner countries as research and development platforms. The collaborative structure makes it possible for scientists of the participating institutions to get a detailed insight to the research and development structures and to start common integrated projects. Based on these nucleation-structures after four years the creation of a virtual institute „Joint Institute for NanoBio Technology (JINBiT) to the science and technology exchange between CeNTech / WWU and DNE / GIST will be established to foster and extend the level of cooperation, particularly in the areas of bionics and nanomedicine.



Picture credit: CeNTech

Partners

University of Münster/Center for Nanotechnology (CeNTech)
 Physical Institute; Interface Physics Group
 Prof. Dr. H. Fuchs



Gwangju Institute of Science & Technology (GIST)
 Department of Nanobio Materials and Electronics (DNE); World Class University (WCU)
 Prof. Dr. K. Geckeler

Picture credit: Gwangju Institute of Science and Technology

IT4SE – IT for smart renewable energy generation and use

Like the rest of the world, Germany and New Zealand are facing the danger of global climate change and need to reduce greenhouse gas emissions, a major source of which is the production of energy through the use of fossil fuel. Both Germany and New Zealand therefore share the goal of maximising generation of cost-effective renewable energy, and its conservation through more efficient use. Information technology – including novel mobile and web-based services- will motivate and empower citizens who like to take an active part in this endeavour.

Scientific Background

Efficient energy use along with private generation of renewable energy is becoming more and more important as we move towards a post fossil fuel era. IT4SE is based on the insight that technology-supported tools and services can significantly accelerate this process of change.

However, research activities are still necessary to develop and evaluate such tools and services. For instance, machine learning techniques can be combined with interactive data visualization tools to make consumers aware of their daily energy consumption patterns, and web-based services can assist people with monitoring and sharing privately generated renewable energy with their neighbours

Project and Objectives

The IT4SE project aims to lay the foundation for a scientific and technical exchange, as well as future cooperative projects, between Germany and New Zealand in the area of new information technologies that encourage the efficient generation and smart consumption of renewable energy by private users. To achieve this objective, the following activities will be carried out:

- Formulation of common research priorities for future cooperative projects, and exploration of funding opportunities at the national and international level.
- Establishment of a network of stakeholders from research, industry, and other associations and individual users interested in intelligent generation, monitoring, and use of renewable energy.
- Set-up of an IT4SE internet portal for the purpose of supporting the aforementioned network. The portal will serve as a point of contact and support the sharing of information. The portal will also gradually provide a framework for hosting services related to intelligent generation, monitoring, and use of renewable energy.
- Exchange of researchers between the partner institutions. Guest researchers will contribute towards the objectives of the related collaborative research projects, including the development of the first demonstrative service for the IT4SE internet portal.
- Set-up of a coordination bureau at the University of Applied Sciences Augsburg for handling organisational and administrative tasks.

Partners

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Picture credit: IT4SE, University of Applied Sciences Augsburg

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