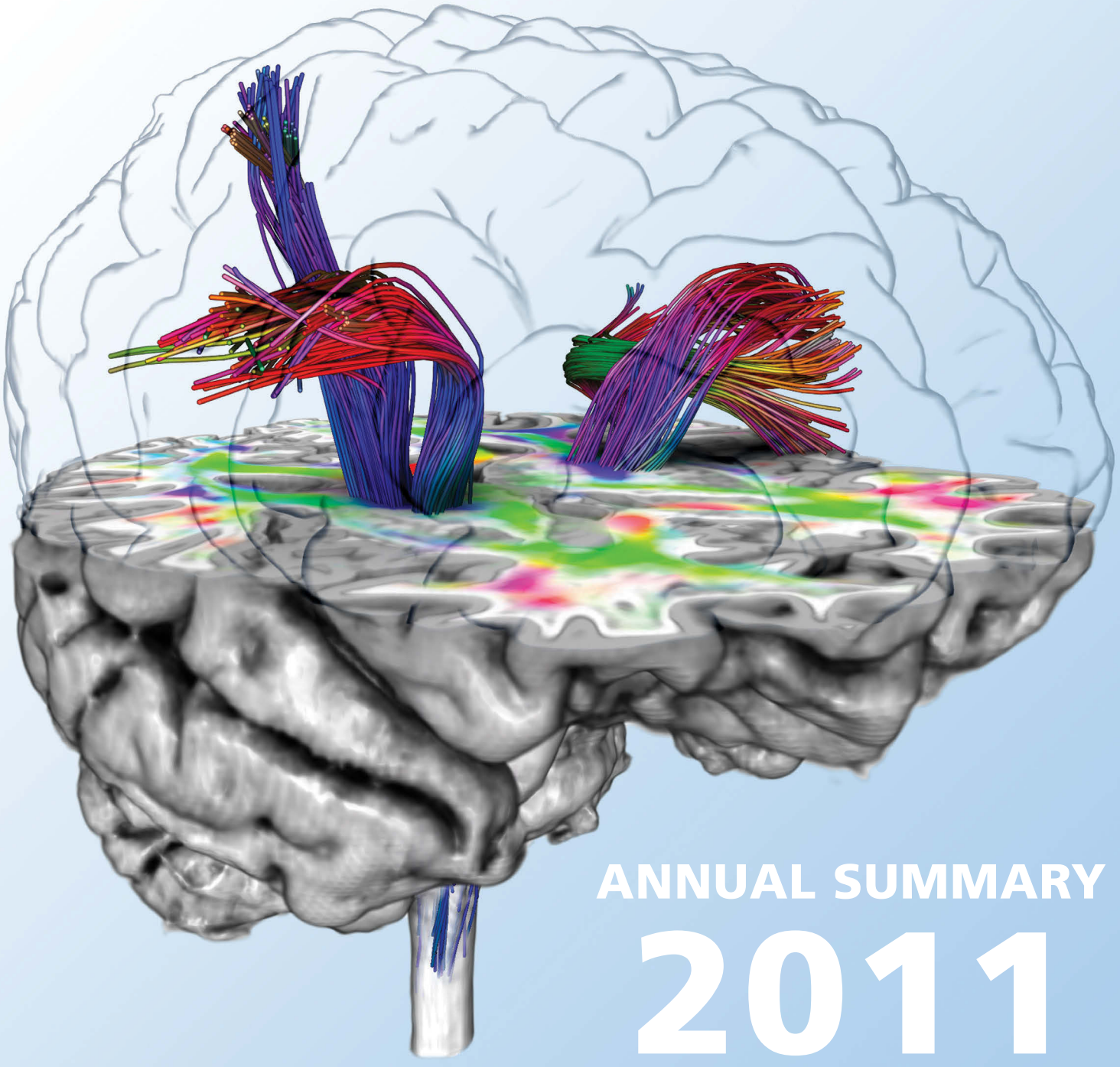
Fraunhofer
MEVIS

INSTITUTE FOR MEDICAL IMAGE COMPUTING



ANNUAL SUMMARY 2011

FRAUNHOFER MEVIS

ANNUAL REPORT 2011

European Union:
Investing in your future
European Regional Development Fund

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FRAUNHOFER MEVIS AT A GLANCE

BRIEF PROFILE

Fraunhofer MEVIS is an internationally renowned pioneer in the research and development of computer support for image-based medicine. Through close cooperation with clinical users, more than eighty researchers develop patient-specific solutions for medical diagnosis and therapy of epidemiologically and economically important conditions. From the outset, clinical partnerships have driven development, as strong engagement with clinical processes has been the fundamental factor of the success of Fraunhofer MEVIS.

Fraunhofer MEVIS is associated with a total of five professorships at the University of Bremen, Jacobs University Bremen, and the University of Lübeck. Since 2011, Fraunhofer MEVIS has a 3-tesla MRI machine at its disposal. In cooperation with industrial partners, Fraunhofer MEVIS has established a quality-assured innovation chain from basic research to clinical prototypes to certified medical products.

Clinical Commitment

Research and development at Fraunhofer MEVIS pursues a clinical direction instead of technological or methodological orientations. Thus, work focuses on developing innovative solutions for image-based medical processes and their industrial implementation for clinical use. Identifying and analyzing clinical issues demands a deep understanding of medical research and calls for close cooperation with clinical partners. Fraunhofer MEVIS maintains an international network of over 100 clinical partners. This clinical network is an essential source of user feedback for evaluating the clinical relevance and feasibility of developed solutions. Only through this clinical commitment has Fraunhofer MEVIS succeeded, for instance, in submitting the first model project for mammography screening to a national competition in Bremen and, within the framework of the German Federal Ministry of Education and Research (BMBF) VICORA Project, establishing a radiological partner network of the largest university clinics in Germany.

Industrial Collaboration

True innovation, the successful launch of solutions onto the market, is only possible through close collaboration with industrial partners, who possess necessary resources and market know-how and fuel the development of new technologies. Fraunhofer MEVIS functions as the link between clinicians and industry with the aim of establishing developed solutions for clinical use. The industrial transfer of applied research is a pillar of the institute and a requirement for future research. Industrial research and development partners and clients include large medical technology firms, such as Siemens AG, as well as medium-sized enterprises, such as spin-off MeVis Medical Solutions AG.

Certification

Successful introduction of innovative approaches into the market requires adherence to specific regulations, such as the German Act on Medical Devices (MPG) or the approval guidelines of the United States Food and Drug Administration (FDA). Fraunhofer MEVIS is one of only a select group of research facilities that, since 2005, has been certified according to the EN ISO 9001 and EN ISO 13485 quality standards for medical products. This certification lays out well-defined steps for industrial cooperation. In addition, Fraunhofer MEVIS also possesses experience with CE and FDA approval for clinical environments.

A Complete Innovation Cycle

Together with industrial partners, Fraunhofer MEVIS has established a quality-controlled innovation cycle that spans across applied research and development, clinical prototypes, and certified medical products, which were awarded the Deutscher Gründerpreis (a German business founder award) in 2006. Content for this innovation cycle is provided by a network of clinical partners and numerous research alliances. Following regulatory requirements, the MeVis Group and other industry partners test software prototypes by Fraunhofer MEVIS for safety and then

develop them into products to be introduced into the market. This process has generated a number of medical products that are leaders in their respective markets. Prime examples of this leadership include products for digital screening mammography evaluation, MR mammography, and liver operation planning.

The MeVisLab Software Platform

The need for an integrated research and development platform for clinical software solutions was recognized at an early stage. MeVisLab is a fluid environment equally suited for both highly flexible development of clinical software solutions and for developing products or methods for fields such as image analysis, visualization, and biophysical modeling. The joint use of MeVisLab at Fraunhofer MEVIS and partners in research, medicine, and industry promotes synergy and accelerates development, ensuring engagement between the links of the chain of innovation.

Field of Activity

Work at Fraunhofer MEVIS deals with epidemiologically significant diseases, such as tumors (especially in the breast, liver, prostate, and brain), cardiovascular diseases, neurological diseases, and lung disease. Cooperation with clinical partners has led to the creation of numerous patient-specific image-based software solutions to support early detection, diagnosis, and therapy. Many of these software solutions have found their way into clinical use as research prototypes or medical products. Major focuses of research at Fraunhofer MEVIS include developing algorithms (e.g., to quantitatively analyze image data, measure tumor size, or evaluate the form and function of an organ), as well as comprehensive clinical software for applications like preoperative planning and intraoperative support of therapeutic intervention. Further important fields of activity include visualization, human-computer interaction (HCI), multimodal support, and workflow optimization.

For the future development of medical image computing, a key issue is how to bridge the gap between information in medical imagery and patient-specific clinical realities. These emerging trends have led to the establishment of three new fields of activity at Fraunhofer MEVIS.

Modeling and Simulation

A significant sector of work is mathematical modeling and numerical simulation of biophysical processes. Mathematical models and numerical simulations can be used in clinical routines to optimize interventions in a patient-specific, robust fashion and to increase the safety of a prognosis. A private donation from honorary Bremen citizens Conrad and Lotti Naber helped establish an endowed professorship in modeling and simulation at Jacobs University Bremen to which Prof. Dr. Tobias Preußer was appointed at the beginning of 2009.

Imaging Physics

A further field of future study consists of the integration and mutual optimization of image acquisition and analysis. The Stiftung Bremer Wertpapierbörse helped establish an endowed professorship in imaging physics at the University of Bremen. This professorship, which focuses on magnetic resonance imaging and spectroscopy, was awarded to physicist Prof. Dr. Matthias Günther in November 2009. Since May 2011, Fraunhofer MEVIS is operating together with Fraunhofer ITWM and the University of Bremen its own 3 tesla MRI scanner, located at the Technologiepark Bremen.

Project Group Image Registration

Through the financial support of the State of Schleswig-Holstein and the European Union, the Fraunhofer MEVIS Project Group Image Registration was established at the University of Lübeck in April 2010. Under the direction of mathematician Prof. Dr. Bernd Fischer, the internationally renowned project group addresses medical image registration, a key skill in medical image computing. The goal of registration is to harmonize medical imagery gathered from different processes (modalities),

capture times, or patients, so that this information may be evaluated together.

Development of the Institute

The current Fraunhofer MEVIS institute was founded in August 1995 in the form of a non-profit limited liability company (gGmbH) as MeVis – Center for Medical Diagnostic Systems and Visualization. For much of this time, MeVis's sole partner was the Verein zur Förderung der wissenschaftlichen Forschung in der Freien Hansestadt Bremen e.V., a publicly funded organization that promotes scientific research in Bremen. To expand the institute, MeVis received yearly funding from the State of Bremen. Prof. Dr. Heinz-Otto Peitgen was appointed executive director, and an international scientific advisory board oversaw research. In 2006, the institute was renamed MeVis Research GmbH, Center for Medical Image Computing.

Since 1997, MeVis Research has produced several legally and financially independent spin-offs that were consolidated in 2007 into MeVis Medical Solutions AG, a publicly traded company that employs about 180 additional people.

Affiliation with the Fraunhofer-Gesellschaft

On January 1, 2009, MeVis Research was incorporated into the Fraunhofer-Gesellschaft and renamed Fraunhofer MEVIS, Institute for Medical Image Computing (Institut für Bildgestützte Medizin). Prof. Dr. Heinz-Otto Peitgen was appointed Institute Director.

With this induction, the Fraunhofer-Gesellschaft aims to strengthen its competence in the growing fields of medical technology and the healthcare. For Fraunhofer MEVIS, new opportunities include expanding existing fields of application as well as venturing into new ones.

During the five-year transitional phase from, the institute in Bremen and the project group in Lübeck receive funds from the State of Bremen and the State of Schleswig-Holstein, respectively, which is supplemented by support from the European Regional Development Fund (ERDF).

On June 4, 2009, the constituent assembly of the Board of Trustees convened and elected Prof. Dr.-Ing. Erich R. Reinhardt of Medical Valley EMN chairman. Since the beginning of 2009, Fraunhofer MEVIS has been a member of the Information and Communication Technology Group (ICT) of the Fraunhofer-Gesellschaft whose deputy chairman is Prof. Dr. Heinz-Otto Peitgen.

OPERATING AND ORGANIZATIONAL STRUCTURES

Fraunhofer MEVIS's interdisciplinary focus incorporates medicine, science, and industry and is reflected in the institute's operating principles and organizational structure. Researchers are not bound to strict, hierarchically organized work groups; they function in a flexible work environment that consists of medically defined domains and technologically oriented focuses which together dynamically adapt to the demands of research and development. This matrix of domains and focuses is the basis for the creation of project teams. According to the demands and affiliation of each project, Fraunhofer MEVIS researchers may belong to multiple domains, focuses, or project teams.

This form of collaboration promotes cooperation between researchers for current projects and facilitates putting synergies into practice. This fosters the exchange of application-specific expertise and allows researchers to introduce their own multidisciplinary competencies for the benefit of the institute as a whole.

The domains are grouped according to medically relevant topics such as organ systems, disease patterns, or diagnosis and therapy procedures. Current domains include tumor diseases as well as organ systems of the breast, liver, lung, brain, heart, and blood vessels. The technologically oriented focuses are organized according to fundamental cross-application issues. Current focuses address cross-cutting themes such as the emerging fields of modeling and simulation, magnetic resonance imaging, and image registration, as well as conventional fields of image analysis and visualization. Members of domains and focuses elect coaches who coordinate work and meetings. Domains and focuses are important vehicles for exchanging expertise and developing new project ideas.

The networked organizational structure of Fraunhofer MEVIS, composed of domains, focuses, and project teams, is illustrated in the adjacent figure.

The Heads of the Institute are:

- Prof. Dr. Heinz-Otto Peitgen (Institute Director)
- Prof. Dr.-Ing. Horst K. Hahn (Deputy Institute Director)
- Dipl.-Betrw. Thomas Forstmann (Administration)

The directors are assisted in operational tasks by the extended institutional management. The small committee (Kleines Gremium) includes, in addition to the directors:

- Prof. Dr. Bernd Fischer (Project Group Image Registration)
- Prof. Dr. Matthias Günther (MR Imaging)
- Prof. Dr. Tobias Preußer (Modeling & Simulation)
- Dr. Stefan Kraß (Clinical Partners and Industry)
- Dr. Markus Lang (Personnel, Law, and Industry)
- Dr. Guido Prause (Publicly Funded Public Projects, PR)

Additionally, the large committee (Großes Gremium) includes an employee representative (see below) as well as:

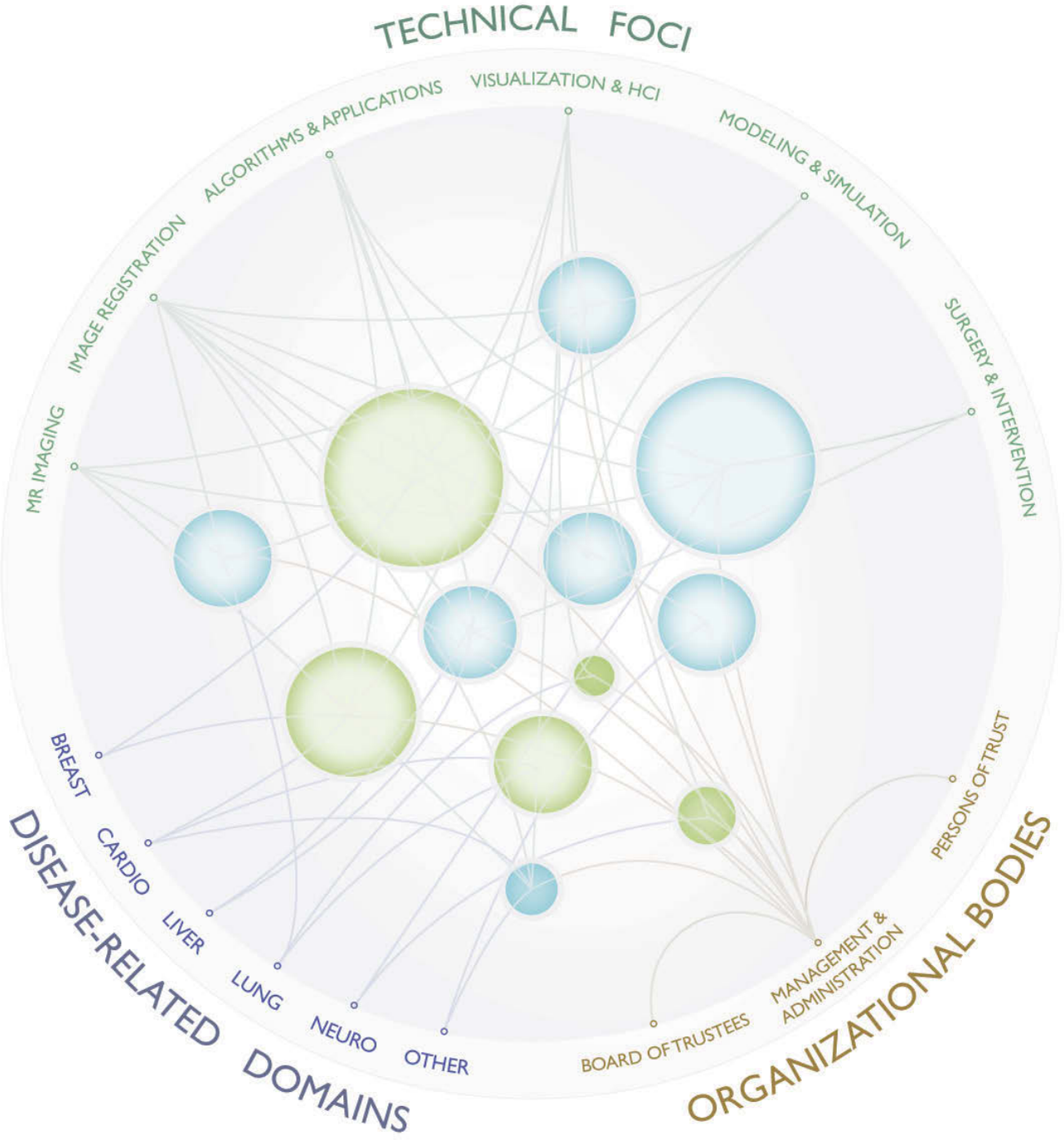
- Dr. Jan-Martin Kuhnigk (Software, IT)
- Dr. Christina Stöcker (Equal Opportunity)
- Dr. Stephan Zidowitz (Certification, QM)

Office management tasks (IT, Personnel, and Accounting) are undertaken by the administration, which also make up the secretary's office:

- Roswitha Hornung, Karin Entelmann (Bremen)
- Anja Pawlowski (Lübeck)

The Board of Trustees of Fraunhofer MEVIS, composed of nineteen members with backgrounds in research funding, business, science, and medicine, advises the management in issues of scientific focus and industrial application.

Each year, four employee representatives are elected from the staff, excluding the management. These employee representatives function as liaisons and mediators when needed.


TECHNICAL FOCI
ALGORITHMS & APPLICATIONS
VISUALIZATION & HCI
MODELING & SIMULATION
SURGERY & INTERVENTION
IMAGE REGISTRATION
MR IMAGING
BREAST
CARDIO
LIVER
LUNG
NEURO
OTHER
DISEASE-RELATED DOMAINS
PERSONS OF TRUST
MANAGEMENT & ADMINISTRATION
BOARD OF TRUSTEES
ORGANIZATIONAL BODIES

BOARD OF TRUSTEES

On June 1, 2011, the Board of Trustees of Fraunhofer MEVIS assembled for the third time under the direction of Chairman Prof. Dr.-Ing. Erich R. Reinhardt. For the Project Group Image Registration at the University of Lübeck, a representative from the Ministry of Science, Economy and Traffic of the State Schleswig-Holstein was appointed to the Board of Trustees.

The report on the current situation of the Fraunhofer-Gesellschaft was given by Dr. Volker Tippmann from the Headquater in Munich. Institute Director Prof. Dr. Heinz-Otto Peitgen presented the most recent developments as well as the intermediate-term perspectives of Fraunhofer MEVIS in Bremen and the project group in Lübeck.

The Fraunhofer MEVIS Board of Trustees currently consists of the nineteen individuals listed below.

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Medical Valley
Erlangen

Vice Chairman

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German Cancer Research Center, Heidelberg

University of Bremen / Jacobs University

Prof. Dr. Jens Falta
Institute of Solid State Physics
University of Bremen

Dr. Alexander Ziegler-Jöns
Vice President of University Development
Jacobs University Bremen

Image Caption:
Attendees of the second assembly of the Fraunhofer MEVIS Board of Trustees in Bremen on June 2, 2010

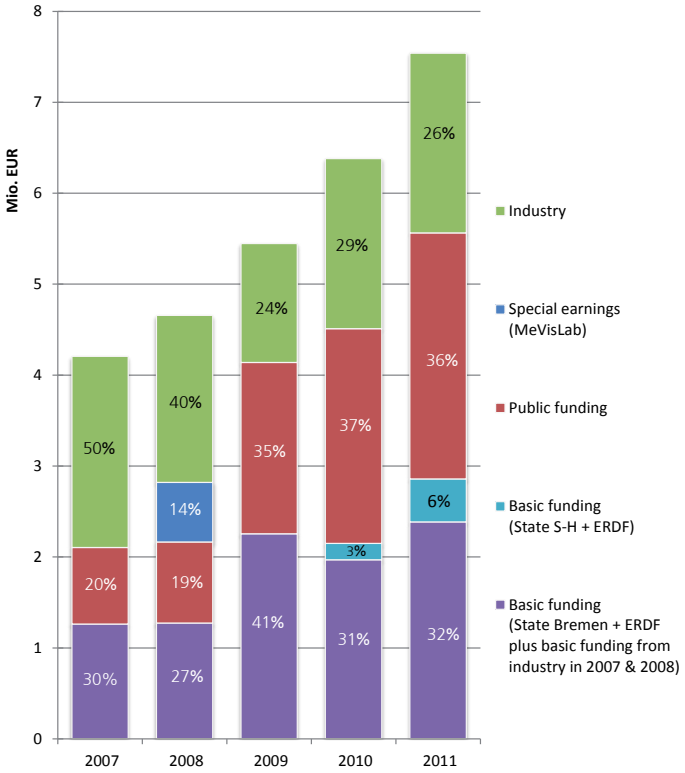
THE INSTITUTE IN FIGURES

Budget and Earning Trends

The following section describes the figures for the entire MEVIS institute, which consists of the main institute in Bremen and the Lübeck Project Group (PG). When appropriate, the figures for these institutes are given separately.

The year 2011 was marked by further growth. Compared to the previous fiscal year (PFY), earnings of the entire institute rose by +18% (PFY +17%, including +6% from the Lübeck PG) to 7,540 thousand euro (TEUR) (PFY 6,380 TEUR). Industrial and other earnings rose moderately by +6% over the strong increase in the previous fiscal year (+43%). The strongest development was seen with +33% (PFY -13%) in the deficit-driven basic financing. On the one hand, this was due to the 3-Tesla MRI scanner which was acquired partly through basic financing in 2011, and, on the other hand, due to the Lübeck PG's basic financing. Funds from public authorities rose by +15% over the previous year (PFY +25%). Here the ending of the BMBF-funded joint research project FUSION could be compensated by projects with other Fraunhofer institutes.

The following tables summarize the development of the overall budget of Frauhofer MEVIS as well as the separate budgets of the institute in Bremen (HB) and the Lübeck PG (HL) for the period 2007 to 2011. Figures are given in TEUR, itemized into operating budget (OB) and investment budget (IB).



Total earnings for the period 2007 to 2011 (2010 = Bremen & Lübeck)

Development of Budget Lübeck in TEUR:

	2007	2008	2009	2010	2011
OB:	0	0	0	160	446
IB:	0	0	0	23	91
Total	**0**	**0**	**0**	**182**	**537**

Overall Budget in TEUR:

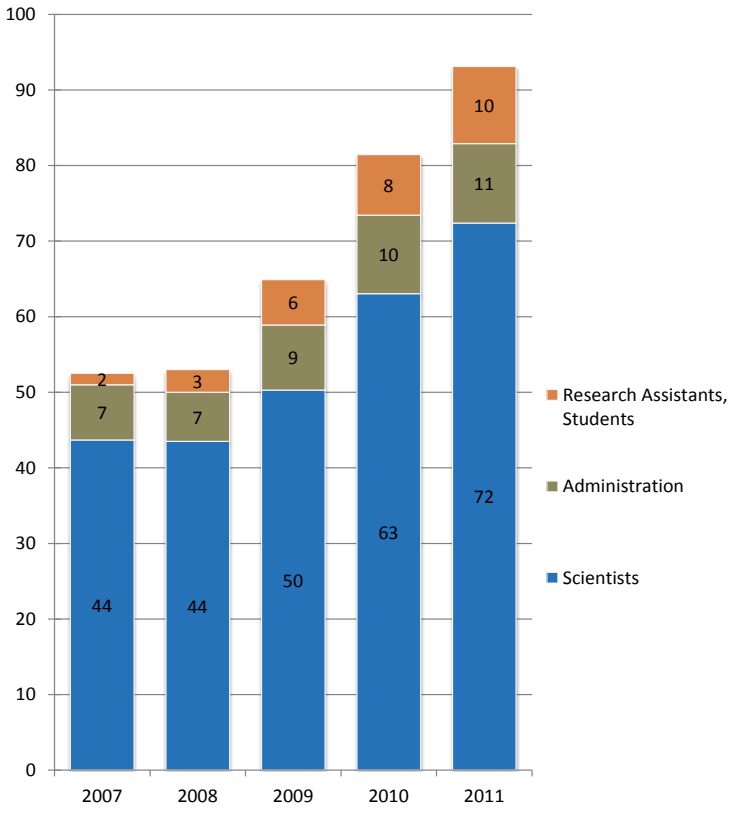
	2007	2008	2009	2010	2011
OB:	3 768	4 103	5 121	6 162	6 981
IB:	273	281	326	218	559
Total	**4 041**	**4 383**	**5 446**	**6 380**	**7 540**

Development of Budget Bremen in TEUR:

	2007	2008	2009	2010	2011
OB:	3 768	4 103	5 121	6 002	6 535
IB:	273	281	326	195	468
Total	**4 041**	**4 383**	**5 446**	**6 197**	**7 003**

Human Resources

In 2011, the institute experienced a +15% (PFY +25%) rise in the number of researchers and a +28% (PFY +33%) rise in the number of research assistants. The number of administrative personnel rose through part-time activities overall by one position or +1%. Together, Fraunhofer MEVIS employed an average of twelve (PFY +16) new personnel in 2011 (+7 in Bremen; +5 in Lübeck). With the founding of the Lübeck PG, three former Bremen employees relocated to Lübeck.



Human Resources Development (full-time equivalent positions at year's end) in the period 2007 to 2011 (since 2010 = Bremen & Lübeck)

THE FRAUNHOFER-GESELLSCHAFT

Research of practical utility lies at the heart of all activities pursued by the Fraunhofer-Gesellschaft. Founded in 1949, the research organization undertakes applied research that drives economic development and serves the wider benefit of society. Its services are solicited by customers and contractual partners in industry, the service sector, and public administration.

At present, the Fraunhofer-Gesellschaft maintains more than 80 research units in Germany, including 60 Fraunhofer Institutes. The majority of the more than 20,000 staff are qualified scientists and engineers, who work with an annual research budget of €1.8 billion. Of this sum, more than €1.5 billion is generated through contract research. More than 70 percent of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. Almost 30 percent is contributed by the German federal and state governments in the form of basic financing, enabling the institutes to work in advance on solutions to problems that will not become acutely relevant to industry and society for five or ten years from now.

Affiliated international research centers and representative offices provide contact with the regions of greatest importance to present and future scientific progress and economic development.

With its clearly defined mission of application-oriented research and its focus on key technologies of relevance for the future, the Fraunhofer-Gesellschaft plays a prominent role in the German and European innovation processes. Applied research has a domino effect that extends beyond the direct benefits perceived by the customer: Through their research and development work, the Fraunhofer Institutes help to reinforce the competitive strength of the economy in their local region, and throughout Germany and Europe. They do so by promoting innovation, strengthening the technological base, improving the acceptance of new technologies, and helping to train the urgently needed future generation of scientists and engineers.

As an employer, the Fraunhofer-Gesellschaft offers its staff the opportunity to develop the professional and personal skills that will allow them to take up positions of responsibility within their institute, at universities, in industry, and in society. Students who choose to work on projects at the Fraunhofer Institutes have excellent prospects of starting and developing a career in industry by virtue of the practical training and experience they have acquired.

The Fraunhofer-Gesellschaft is a recognized non-profit organization that takes its name from Joseph von Fraunhofer (1787–1826), the illustrious Munich researcher, inventor, and entrepreneur.

THE YEAR 2011

HIGHLIGHTS

In the 2011 reporting year, the third as part of the Fraunhofer-Gesellschaft, Fraunhofer MEVIS made great strides in terms of both personnel and finance. The following section illuminates a selection of the many events that took place as part of the German Year of Science 2011 – "Research for Our Health".

Launching the 3-Tesla MRI Scanner

On March 28, 2011, Fraunhofer MEVIS acquired its own magnetic resonance imaging scanner, located on the premises of COGNIUM at the University of Bremen. The Siemens MAGNETOM Skyra is valued at approximately 2 million euro and provides a field strength of 3 Tesla, representing the state of the art in medical imaging. On June 15, 2011, senior scientific and industrial representatives attended a symposium in Bremen, during which the MRI scanner was officially put into service.

The acquisition of the MRI scanner underlies the cooperation between Fraunhofer MEVIS, the Fraunhofer Institute for Industrial Mathematics (ITWM) in Kaiserslautern, and neuroscientists at the University of Bremen. A primary goal of the work at Fraunhofer MEVIS is to more closely link imaging and image analysis to improve computer support in image-based diagnosis and therapy. For doctors and patients, this promotes the use of innovative MR imaging without the need for contrast agents.

Fraunhofer MEVIS Project Group Image Registration

The Fraunhofer MEVIS Project Group Image Registration at the University of Lübeck has made substantial progress. In April 2010, the Project Group was founded with four employees, and by the end of 2011, this number had grown to eleven. The Project Group is an industrial partner in the development of clinical solutions and new technologies for image-supported diagnosis and therapy. The Project Group's portfolio ranges from registration expertise for software to consulting services and system solutions. Providing custom solutions that are reliable, quality-assured, and optimized is the goal of the Project Group's work. Thanks to the Project Group's connections to national and international research projects, the range of products is aligned with leading standards.

The Project Group constitutes a vital link between university mathematics and practical application, and the Group's close connection to the Institute of Mathematics and Image Computing (MIC) at the University of Lübeck plays a central role.

Fraunhofer Internal Networking

During the reporting year, Fraunhofer MEVIS continued to establish close relationships within the Fraunhofer-Gesellschaft through joint projects, partnerships, and other affiliations. In early 2009, Fraunhofer MEVIS joined the Fraunhofer Information and Communication Technology Group (Fraunhofer-Verbund IUK-Technologie), to which Prof. Peitgen was elected deputy chairman the previous year. 2009 saw Fraunhofer MEVIS join MARIUS (Magnetic Resonance Imaging Using Ultrasound), part of the MAVO (market-driven preliminary research) funding program, as well as SKINHEAL (development and evaluation of new forms of therapy for chronic skin diseases), part of the "Markets of Tomorrow" funding program. Fraunhofer MEVIS additionally cooperates in a range of publicly funded projects with fellow Fraunhofer-Gesellschaft institutes.

Hosting the IPMI'11

In cooperation with ETH Zurich, Fraunhofer MEVIS hosted the International Conference on Information Processing in Medical Image Computing (IPMI'11) at the Irsee Abbey in Bavaria from July 3 to 8, 2011. The organization of IPMI'11 was directed by deputy chairman of the MEVIS Advisory Board (Kuratorium) Prof. Dr. Gábor Székely (Chair) and the deputy director of Fraunhofer MEVIS Prof. Dr. Horst K. Hahn (Co-Chair).

The biennial event, which has taken place since 1969, is the oldest international conference in the field of medical image analysis. Research topics include image and signal processing, image registration and fusion, functional and molecular imaging, statistical and mathematical modeling, computer-aided detection, objective image quality assessment, visualization, and novel imaging and image reconstruction techniques.

A record number of 224 contributions were submitted to IPMI'11. Of the 28 percent that were accepted, 24 were presented as talks and 39 as posters.

Neuro Exhibit

As part of the German Year of Science 2011 "Research for Our Health", Fraunhofer MEVIS developed and presented an exhibit on neurological imaging and neurosurgical operation planning at multiple events. The hands-on multimedia exhibit can be interactively explored using a touch-sensitive 3D brain model and touchscreen to demonstrate how different brain areas are associated with various bodily functions through nerve fiber tracts. The exhibit uses data from a healthy patient obtained with diffusion tensor MRI and analyzed with MEVIS algorithms. The exhibit was constructed in cooperation with the Universum Science Center in Bremen.

Under the title "Neue Wege in der Medizin", the exhibit was one of 30 aboard the MS Wissenschaft. The exposition ship of the German Federal Ministry of Education and Research sailed through 35 German and Austrian cities from May 19 to September 29, 2011, hosting over 72,000 visitors. From November 10, 2011 to February 20, 2012, the neuro exhibit attracted 1,200 visitors as part of an exposition at the House of Science in Bremen entitled "Wissen schaf(f)t Gesundheit – Forschung in Bremen".

Youth Development

Fraunhofer MEVIS participates in a wide array of development programs for students from third grade through university, including Children's University, Girls' Day, and Summer Academy as well as sponsoring internships and hosting school visits.

In 2011, the first Mathematics Research Day was organized by Fraunhofer MEVIS in cooperation with the Matelier of the University of Bremen Mathematics Department. The event let third- and fourth-grade students research and participate in interactive math lectures held by the institutes' mathematicians. The first annual fall internship, sponsored in conjunction with the Bremen Technology Park, gave students from ninth to thirteenth grades two weeks to gain insight into the activities of the institutes and firms at the technology park.

Finally, Fraunhofer MEVIS expanded its student development activities in 2011 through internships and thesis mentoring. In the reporting year, 16 bachelor theses and seven master theses were either completed at the institute or supervised by Fraunhofer MEVIS staff.

PUBLICLY FUNDED PROJECTS

In the 2011 reporting year, multiple research projects received funding from public agencies, including the European Commission (EU), the German Federal Ministry of Education and Research (BMBF), and the German Research Foundation (DFG).

EU Project FUSIMO: Focused Ultrasound

Focused ultrasound is a promising therapy procedure for minimally invasive treatment of tumors that lie close to the skin. FUSIMO (Patient-specific Modeling and Simulation of Focused Ultrasound in Moving Organs) develops, implements, and evaluates a multiscale model for focused ultrasound interventions on stomach organs which accounts for respiratory movement. The EU-financed project has been funded for three years and is composed of eleven partners from nine countries under the direction of Fraunhofer MEVIS.

In the context of the FUSIMO project, Fraunhofer MEVIS researches mathematical models and numerical simulations for physiological processes in target organs and is heavily involved in developing software demonstrators for therapy simulation. This involvement and leadership strengthens Fraunhofer MEVIS' portfolio in focused ultrasound, one of the most promising minimally invasive therapies.

EU Project WAKE-UP: Stroke Diagnosis

One out of five strokes occurs at nighttime while the affected person sleeps. Choosing the most effective therapy is important in identifying the exact time the stroke occurs, because a blood clot can only be medicinally dissolved within four and a half hours after vessel occlusion. At later stages, dissolving a cerebral hemorrhage with blood-thinning medication carries too much risk.

The WAKE-UP clinical study (Efficacy and safety of MRI-based thrombolysis in wake-up stroke: a randomised, double-blind, placebo-controlled trial) aims to prove that MR imaging can help determine cerebral infarction with sufficient accuracy to predict if a stroke patient could benefit from MRI-based thrombolysis. The University Medical Center Hamburg-Eppendorf directs the project and is joined by twelve partners from six different countries.

BMBF Project MALDI-AMK

The technology behind MALDI imaging (matrix-assisted laser desorption/ionization) is relatively young and is on the verge of entering the clinical routine. The project targets three main applications: molecular histology, detection of disease-specific biomarker, and quantification of pharmaceutical products and metabolites in tissue.

In cooperation with industrial and research partners, the MALDI-AMK project (3D MALDI imaging for analysis of proteomic markers and clinical distribution of active ingredients) will investigate these three applications for breast cancer, pancreatic carcinoma, and head and neck tumors. The primary focus of Fraunhofer MEVIS is registering separate MALDI datasets with each other as well as with anatomical MRI data.

DFG Project RFITT-3: Radiofrequency Ablation

Radiofrequency ablation (RF ablation) of liver metastases is an alternative treatment to surgical resection which is characterized by reduced invasiveness and improved organ conservation. In this procedure, needle-shaped applicators are inserted into tumors and apply electrical current to heat and destroy them.

The project is in its third funding phase and has run since 2002 in cooperation with Charité Berlin, Campus Benjamin Franklin. Currently, the simulation models for RF ablation developed by Fraunhofer MEVIS are being refined for use and validation in clinical applications.

ACADEMIC PUBLICATIONS 2011

Journal Articles

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Bauer, M., Barbieri, S., Klein, J., Egger, J., Kuhnt, D., Freisleben, B., Hahn, H. K., & Nimsky, C. (2011). Boundary estimation of fiber bundles derived from diffusion tensor images. Int J CARS, 6(1), 1–11.

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