Information Systems and Database Technology

Staff

- Professors:
  - Prof. Dr. rer. pol. Matthias Jarke
  - Prof. Dr. Thomas Berlage
  - Prof. Gerhard Lakemeyer, Ph.D.
  - Prof. Wolfgang Prinz, Ph.D.
  - Prof. Dr. Thomas Rose (since 1.10.2004)

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- Researchers:
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  - Aida Jertila
  - David Kensche (since 1.9.2004)
  - Dr. Ralf Klamma
  - Dr. Roland Klemke
  - Frank Köhne (until 31.8.2004)
  - Dr. Thomas List (until 20.4.2004)
  - Dominik Lübbers
  - Michael Miatidis
  - Dr. Hans Wilhelm Nissen (until 31.8.2004)
  - Bernd Quade (since 2.11.2004)
  - Dr. Christoph Quix
  - Dr. Lemonia Ragia
• Researchers continued:
  
  Moez ur Rehman (until 31.8.2004)
  Dominik Schmitz
  Martin Sedlmayr (since 4.11.2004)
  Christian Seeling (since 4.11.2004)
  Marc Spaniol
  Satish Srirama (since 1.9.2004)
  Dirk Staskiewicz (until 31.8.2004)
  Carla Valle (since 1.10.2004)

• Visiting Lecturers:
  
  Dr. Andreas Becks, Fraunhofer FIT
  Dr. Wolfgang Broll, Fraunhofer FIT

• Technical Staff:
  
  Tatiana Liberzon
  Reinhard Linde
  Jörg Mathieu

• Student Researchers:
  
Overview

Informatik V represents the field of databases and information systems at RWTH Aachen University. A major focus is the formal analysis, prototypical development, and practical application of metadata systems. Specific areas include Internet Information Systems and Knowledge Management, Electronic Business Support, Electronic Learning, Database and Repository Technologies, and Requirements Engineering for Complex Systems.

Informatik V cooperates closely with the Fraunhofer Institute for Applied Information Technology (FIT) of which Prof. Jarke is Executive Director. Two FIT area managers, Professors Wolfgang Prinz and Thomas Berlage, hold cross appointments as Associate Professors in Informatik V; in 2004 Thomas Rose, leader of the business process management group at FIT, received a joint appointment as Associate Professor of Media Processes in the context of the Bonn-Aachen International Center for Information Technology (B-IT) in which Prof. Jarke is one of the Founding Directors. Major B-IT activities in 2004 were the move into the freshly renovated B-IT Building in Bonn, a successful accreditation audit, and the start of a joint European Master with the Universities of Edinburgh and Trento within the prestigious Erasmus Mundus Programme. Other joint activities with FIT include Semantic Web EU project SEWASIE and the European Network of Excellence in Technology-Assisted Learning (PROLEARN). Together with Fraunhofer FIT and with the FIR Institute at RWTH Aachen University, Informatik V won a IBM Shared University Grant in the field of Coopetition in Life Science and Automotive Engineering against strong international competition.

The Aachen-Bonn-Cologne joint Research College 'Media and Cultural Communications' (SFB 427), one of the largest DFG-funded projects in the cultural sciences in Germany, was successfully reviewed for the third time in the summer of 2004 and will be funded for the last four years with an again increased budget, quite an unusual achievement in the economically not so easy times. Building on selected results of our work in the recently completed DFG PRIME project and in the Collaborative Research Center on Computer-Assisted Chemical Engineering (SFB 476, IMPROVE), a new BMBF-funded joint project with industry started in the field of experience-based process management in plastics engineering.

After four years as Vice President and Treasurer of GI, the German Informatics Society, Prof. Jarke was elected as GI President for the 2004-2005 election period. Among other activities, he organized a Dagstuhl Perspective Seminar on the Future of Software Engineering Research together with Professors Broy (Munich) and Rombach (Kaiserslautern). Prof. Jarke was also re-elected for another four years as Senior DFG Reviewer for Practical Computer Science.

Several Informatik V researchers took new positions. After completing her habilitation, Priv.-Doz. Mareike Schoop received three offers for Full (C4) Professorships from the universities of Hohenheim, Koblenz, and Vienna, and joined the University of Hohenheim together with three Ph.D. students from Informatik V in the Fall
of 2004; she was also recipient of the 2004 Friedrich-Wilhelm Habilitation Prize at RWTH Aachen University. B-IT Assistant Director Dr. Hans Nissen was appointed Professor of Software Engineering at FH Köln, and former Informatik V Graduate Dr. Stephan Jacobs (Ericsson EuroLabs) was appointed Professor of Business Informatics at FH Aachen. Dr. Ralf Klamma served as Substitute Professor at the Universities of Chemnitz and Passau. Thomas List completed his dissertation at RWTH Aachen University and took a position with the NRW Statistics office. Dr. Christoph Quix and Dr. Lemonia Ragia participated in research visits to Microsoft Research in Redmond, Wash. Despite the six employees that left in this way, the net size of the group grew through the addition of eight new researchers and Ph.D. students.

Research Projects

Internet-based community support

M. Jarke, R. Klamma, R. Linde, S. Srirama, C. Valle, J. Mathieu

Since 1995, Informatik V is active in the field of internet-based community support, both in terms of research on community and web service tools and in terms of providing infrastructure for scientific communities worldwide. For example, Informatik V hosted the first website for the city of Aachen in 1995 and, since the same year, manages one of the most successful public-domain internet servers in the German science net, SunSITE Central Europe (http://sunsite.informatik.rwth-aachen.de). Supported by Sun Microsystems with powerful hardware and base software, SunSITE Central Europe focusses on scientific community support, including mirrors of some of the most important research literature indexes, workspaces for internet cooperation, and about 1 TB of open source software. Typically, the SunSITE enjoys several million accesses per month. As one special activity, in 2004 the NRW-funded project WWBIT was completed in which - jointly with the University of Bonn - an internet portal for continuing education by NRW universities was developed together with several concepts of how to improve these offerings and their marketing.

In terms of research, several dissertation projects are ongoing in this field. After completing a highly successful master thesis on the topic of mobile web service provisioning in cooperation with Ericsson EuroLabs, Satish Srirama was accepted into the Ph.D. College “Software for Mobile Communications” where he further refines and evaluates one of the first approaches worldwide to operate a web service provider on smart phones.
ConceptBase is a multi-user deductive object manager mainly intended for conceptual modelling, metadata management and model management. The system implements the knowledge representation language *Telos* which amalgamates properties of deductive and object-oriented languages. In December 2004, ConceptBase version 6.1 has been released, which has been registered by more than 100 users within a month. Furthermore, Christoph Quix was invited for a visit of Microsoft Research for three months, working on new techniques for model management and schema matching.
Knowledge discovery, knowledge management and mobile access in combination with trusted security play a crucial role in the business processes of the future. Flexible information and knowledge networks with several partners provide the basis for success in the information society. The “Living Coopetition” initiative of Informatik V, FIT, and FIR aims to enable such networks by powerful concepts and information architectures like services-on-demand. Two case studies will demonstrate the performance of these concepts. While the first case will be elaborated within a knowledge network of automotive suppliers, the second case will be situated within the life science area. The “Living Coopetition” initiative requires a powerful information system infrastructure to achieve its objectives. This includes first of all sufficient computing performance for data management, digital image analysis and processing as well as information retrieval in complex information structures. In particular, we will demonstrate Itanium-based enterprise servers and Opteron-based cluster systems with Thinkpad clients as attractive computing platforms and a software infrastructure centered around WebSphere and DB2.

The main event of the cultural science research center (SFB 427) in 2004 was the successful review of the whole center leading to four further years of funding and especially our subproject ‘Agency in digital social networks by visualization of multidimensional patterns of disturbance’. The subproject ‘Impact of multimedia information systems on communication and knowledge organisation in cultural science projects’ was finished in 2004. We cooperated with RWTH Klinikum and German philology to support a community of aphasics with a specially designed Chat/Talk tool (SOCRATES). Together with colleagues from University of Bochum we developed a technology enhanced course “Pathos and Passion” for students in the cinematics sciences (MECCA-Learn). In the context of this research field, Dominik Lübbers investigates in his ongoing Ph.D. thesis user-adaptive retrieval strategies for music da-
Besides preparing the new proposal and consolidating ongoing cooperations and implementation work we presented our results to the scientific audience. In 2004 we co-organized the three day symposium ‘The Ruses of Evidenz’ where we demonstrated our reflective measurement and analysis environment MAVIS. The ongoing cooperation with the research group ‘Narratology’ at the University of Hamburg (Jörg Schöngert) was strengthened and extended by a joint workshop in Hamburg together with our colleagues from FIT. We presented MECCA and BSCW as tools for collaborative research and teaching in the humanities. Marc Spaniol participated in a MIT European Media Lab’s workshop on ‘ICT and Education: Incremental Progress or Fundamental Change?’ in Dublin. Additionally, we presented our research results at major events such as I-Know, ICALT, ICCHP, ICWL, PAKM and the Learntec in Karlsruhe.

ATLAS system architecture as a basis for self reflective information systems in the cultural sciences

PROLEARN: Network of Excellence on Professional Learning

M. Jarke, R. Klamma, A. Chatti, S. Steinfels, M. Pienkos, D. Senk, H. W. Gudenu, K. Mavromatis, A. Babich (and more than 200 other researchers)

Networks of Excellence (NoE) are a new research tool in the 6th framework programme. PROLEARN, started January 1, 2004, is dedicated to join research in the area of professional learning and training focusing on small and medium enterprises (SME). The NoE advances the state of the art in the key areas personalized adaptive learning and interactive media, with learning resources connected to real-world settings and reusable in different contexts. It investigates and advances issues especially relevant for professional training in SME’s and larger companies, including brokerage platforms and services, business models for specific markets, and advanced eLearning and knowledge work management arrangements. To accomplish these goals, the NoE brings together the most important research groups in the aforementioned areas, as well as other key organisations and industrial partners, thus bridging the currently existing gap between research and education at universities and similar organisations and
training and continuous education that is provided for and within companies. The NoE focuses on large scale research cooperation and coordination of degree programs in the context of the PROLEARN Academy, setting up a virtual research centre comprising all consortium members, as well as on exchange and transfer activities especially with industrial partners in the context of the PROLEARN Virtual Competence Centre. It integrate existing and future activities of the 19 NoE core partners and more than 200 associated partners, and ensure the critical mass necessary for mutual complementary exchange of technologies, tools, experiences, and scenarios.

SFB 476 IMPROVE

Information Technology Support For Collaborative and Distributed Design Processes in Chemical Engineering

M. Jarke, M. Miatidis, S. Brandt, M. Schlüter, A. Passen, B. Zaman, J. Renner, M. Ikram, M. Comanns

The collaborative research center (CRC) SFB 476 IMPROVE is funded since August 1997 by the Deutsche Forschungsgemeinschaft (DFG), and aims at improving the processes in chemical and plastics engineering.

In the third and current phase of the CRC the research focusses on cooperative work process support and the aspect of synergetic interleaving. Plans are also being made about continuing the basic research while transferring the research results into concrete projects, in cooperation with the chemical and plastics industry. In this context, Informatik V works on two projects.

In the project “experience-based support for cooperative engineering processes” (B1), work has focussed on the simplification of our underlying PRIME architecture, taking into account the recent contributions made by the field of service-oriented architectures. Some practical experiments were made mostly in the context of plastics engineering applications to try out the practicality of ideas. Current work also focusses on the interaction between the designer and the management layer of engineering work, and on extensions of our decision support facilities.

In the project “goal-oriented management of information flows in engineering design processes” (C1), a process data warehouse is offered as an ontology-oriented infrastructure for semantic access to product and process experience data. Work in 2004 concentrated on including semantic access to documents stored in document management systems, whereas present work focusses on the added problems encountered in the case of inter-organizational cooperation.
MErKoFer

M. Schlüter, M. Jarke, B. Quade, M. Sedlmayr

MErKoFer (“Identification and reuse of experience knowledge in rubber extrusion processes”) is a collaborative project of Informatik V and aiXtrusion GmbH in cooperation with Meteor Gummiwerke K.H. Bädje GmbH & Co. KG. The project was founded in October 2004 and is supported by the Bundesministerium für Bildung und Forschung (BMBF).

In continuous production processes the effects of a modification of process parameters on the product can often only be observed after the entire production cycle has been completed. In case of disturbances this causes the waste of ecological and economical resources, if countermeasures do not directly lead back to a stable production within desired specifications.

After determining the most influential process parameters and applying explorative data mining methods to identify interrelations and temporal dependencies, we correlate product flaws and the according process states. By recording the operator’s actions and evaluating their efficiency, we are able to construct an experience knowledge base. When another problem occurs, we can supply an operator with a number of actions previously accomplished in a similar context. Based on this additional information he has a much better chance to quickly compensate the interference.

TROPOS – Agent-Oriented Requirements Engineering in Strategic Networks

M. Jarke, G. Lakemeyer, G. Gans, D. Schmitz

Inter-organizational networks of people, information and communication systems are often described by the interplay between individual goals and actions and the strategic dependencies among individuals and subgroups. The TROPOS project started in the context of the DFG Focussed Research Programme on Socionics, jointly conducted with the KBS group of Prof. Lakemeyer and the network sociology group of Dr. Funken, and is now expanded in the context of the DFG-funded Graduate School 643 “Software for mobile communication systems”. It aims at improving requirements engineering for such networks by not just representing their goals and dependencies statically, but also by studying the dynamic interactions between both via agent-based simulation through our SNet prototype environment. Key features of SNet are the automatic translation of extended i* models into the process modeling environment ConGolog (via ConceptBase) and to use sophisticated deliberative representatives wi-
thin the simulations. This year’s work concerned extending the modeling facilities by a role concept to allow for higher level modeling (to enable coping with more complex scenarios), introducing inter-agent monitoring, suggestions for specifying the evolution of agents, and import facilities for BPEL process descriptions in order to ease the modeling work.

BMBF/DFG Information System in Earth Management: From Geodata to Geoservices

M. Jarke, L. Ragia, R. Klamma, K. Schetelig (LIH), C. Kiehle (LIH), H. G. Meiners (ahu AG), F. Wendland (FZJ)

The goal of the project is the development of an information infrastructure for the preparation of heterogeneous geodata according to datadriven rules and independent of scales. To demonstrate the use of the infrastructure an example application - the development of an ground water protection function - is deployed. The role of our chair in the project is to share our expertise in data mining, databases, web services and information systems architectures.

SEW ASIE: Semantic Webs and AgentS in Integrated Economies

M. Jarke, M. Schoop, A. Jertila, C. Quix, M. Rehman, Y. Cao, J. Zhang, M. Schnitzler, A. Becks (Fraunhofer FIT), C. Seeling, D. Frese

SEWASIE is a European project with partners from Germany (RWTH Aachen, Informatik V; Fraunhofer Institute for Applied Information Technology (FIT); Thinking Networks AG) and Italy (Università di Modena; Università di Roma “La Sapienza”; Università di Bolzona; CNA Servizi Modena; IBM Italia) funded from 2002-2005 within the Semantic Web initiative. The overall goal of the project is to design and implement an advanced search engine enabling intelligent access to heterogeneous data sources on the web via semantic enrichment to provide the basis of structured secure web-based communication. Informatik V closely cooperates with Fraunhofer-FIT in SEWASIE.

Informatik V develops a communication tool that will support electronic negotiations in business-to-business electronic commerce in two ways. Firstly, ontology-based contract negotiations are enabled that allow human negotiators to use the ontological context of semantic search for structured web-based negotiations. Secondly, ontology negotiations enable negotiators to negotiate about ontologies, the normative and terminological basis of their contract negotiations. FIT develops a monitoring agent.
on top of the query engine to observe information according to long-term interests of users. Graphical methods to explore these personalised information spaces, developed at Informatik V, will be included. FIT also provides functionalities to link observed information into decision support environments based on OLAP. Work in 2004 concentrated on the implementation of an integrated software prototype that shows the overall methodology of the SEWASIE project, and the evaluation of the system within end-users of the textile domain.

DFG Young Researcher Group: Electronic Negotiation Support in Business-to-Business Electronic Commerce

M. Schoop, F. Köhne, D. Staskiewicz, Y. Cao, J. Huster

The research group (DFG-Nachwuchsgruppe) is funded by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) in their “Aktionsplan Informatik”. The group is led by Prof. Dr. Mareike Schoop. Frank Köhne and Dirk Staskiewicz are the two PhD students working in the group. In addition, there are several student assistants. The main goal of the research is to develop comprehensive empirical and formal foundations for supporting human users in electronic commerce negotiations. The three prominent negotiation models (namely negotiation support, auctions, and negotiation agents) will be assessed and compared. The aim is to develop a decision support module that suggests the most appropriate model or combination of models in a given business context. Selected systems implementing one of the negotiation models will be combined into an integrated negotiation module that enables negotiations according to the suggestions of the decision support module. The approach will be validated through the development of a significant prototype system of electronic negotiation with decision support and its evaluation in cooperation with industrial partners in regional networks of small and medium-sized enterprises. In 2004, a student experiments were conducted in cooperation with the University of Münster and the University of Hohenheim in order to assess and evaluate our approach implemented in our negotiation support system Negoisst. Features of the Negoisst system, including decision and communication support, have been evaluated and their contribution to performance and effort expectancy have been assessed. It is concluded, that both types of support are valuable and that a more integrated approach to the design of Negotiation Support Systems is needed. Negoisst has also successfully taken part in the annual negotiation tournament. Several students from the USA, Canada, Germany, Russia, The Netherlands, Taiwan, Great Britain, and Austria negotiated in teams based on a specified scenario (negotiation between a buyer and a supplier of pharmaceutical products) using different negotiation systems such as Negoisst, Inspire, SmartSettle, WebNS, and SimpleNS. The team performance was rated. At the same time, the systems themselves competed so that different approaches can be compared.
Other Activities

Service
Prof. Jarke’s major administrative and service activities in 2004 included:

- Executive Director, Fraunhofer FIT, Birlinghoven
- Founding Director, Bonn-Aachen International Center for Information Technology (B-IT)
- President, GI German Informatics Society
- member, extended management board of FIR Forschungsinstitut für Rationalisierung an der RWTH Aachen
- Supervisory, Curatory and International Scientific Advisory Board, IBFI, Schloss Dagstuhl
- DFG elected reviewer for practical computer science
- BMBF steering committee for research program IT-2006
- chaired one faculty search committee at RWTH Aachen

Dr. Klamma held stand-in professorships at the Technical University of Chemnitz (summer term 2004) and at the University of Passau (winter term 2004). He is a substitute member of the PROLEARN executive board. Dr. Klamma served as study advisor of the master program Software Systems Engineering.

Prof. Schoop was elected as the chair of the GI Special Interest Group on Electronic Commerce.

Editorial Boards
After more than ten years M. Jarke ended his tenure as Editor-in-Chief of Information Systems, the oldest European database journal (SCI Impact Factor: 3.0); R. Klamma served as Assistant Editor. M. Jarke also served on other editorial boards:

- Decision Support Systems
- (electronic) Journal of the AIS
- Requirements Engineering Journal
- Organizational Computing and Electronic Commerce
- Intelligent Information Systems
- Group Decision and Negotiation

Prof. Prinz is Chair of ACMSIGGROUP and Editor of SIGGROUP Bulletins. He is also editor of the i-com magazine and associate speaker of GI-department CSCW (5.14). Besides he is Editorial Collective member of the CSCW Computer Supported Cooperative Work International Journal by Kluwer.

Conference Organization
M. Jarke co-chaired a Dagstuhl Perspective Seminar on Challenges for Software Engineering Research in Germany, Oct. 11-12, 2004, together with M. Broy (TU Munich) and D. Rombach (TU Kaiserslautern). In addition, he was a member of the following


C. Quix was member of the programme committee of the 11th International Conference on Artificial Intelligence: Methodology, Systems, Applications (AIMSA 2004), Varna, Bulgaria, September, 2004.

M. Spaniol was member of the programm committee of the symposium “The Ruses of Evidenz”, Cologne, Germany, February 4-5, 2004.

**Software Demonstrations**

Talks and Publications

Talks


M. Jarke: *B-IT: Bonn-Aachen International Center for Information Technology*, Presentations during visit of NRW Research Minister H. Kraft to China, Beijing; Chengdu, Sichuan; Nanjing, Jiangsu; Shanghai, February, 21-28, 2004.


M. Jarke: *A view in the future: how can we exploit information technology to improve our life?*, Invited Talk, Indo-German Young Leaders Forum, Delhi, India, March 20, 2004.

M. Jarke: *Bonn-Aachen International Center for Information Technology (B-IT)*, Presentation, visit of Jiangsu delegation to NRW, Bonn, April 20, 2004.


R. Klamma: *Unterstützung filmwissenschaftlicher Diskurse in Forschung und Lehre mittels multimedial vernetzter Informationssysteme*, University of Bochum, November 15, 2004.


D. Lübbers: *Logic-based Integration of Multi-Feature Music Information Retrieval*, ISMIR Graduate School, Barcelona, October 8, 2004.


M. Spaniol: Community-orientierte Informationssystementwicklung in den Geisteswissenschaften, Workshop “IT in the Cultural Sciences and Humanities”, Hamburg, Germany, March 26, 2004.

M. Spaniol: Discourse Visualization Strategies for a Comprehensive Medial Analysis of Cultural Science Communities, Conference I-KNOW ’04, Graz, Austria, June 30, 2004.


Publications

Journal Articles

T. Berlage: IT-Unterstützung bei bildbasierten Experimenten, LITUS 2/2004


**Conference and Book Contributions**


Hannelore Kraft signing a cooperation agreement with Jiangsu provincial government in Nanjing, China

The Bonn-Aachen International Center for Information Technology (B-IT) is a pioneering activity of the German Federal government and the state of North-Rhine Westphalia in their effort to establish excellence clusters across universities and research institutes in Germany. B-IT is a joint institute of RWTH Aachen University and Bonn University in cooperation with the Fraunhofer Institute Center Birlinghoven Castle and the FH Bonn-Rhein-Sieg in Sankt Augustin. B-IT is aimed at the internationalization and acceleration of study programmes in Applied Informatics. Supported by the B-IT Foundation and supplementary NRW state and federal funds, B-IT offers highly selective English-language master programmes in Media Informatics, Life Science Informatics, and Autonomous Systems. Moreover, B-IT offers summer and winter
schools for qualified undergraduate students from Bonn and RWTH Aachen University. The B-IT programmes are distinguished by a deep integration of teaching and research through close cooperation with the participating Fraunhofer institutes of Applied Information Technology (FIT), Autonomous Intelligent Systems (AIS), Media Communication (IMK), and Scientific Computing and Algorithms (SCAI). From RWTH Aachen University, Prof. Dr. Matthias Jarke serves as Founding Director (together with Prof. Dr. A.B. Cremers, Bonn, and Prof. Dr. K. Witt, FH Bonn-Rhein-Sieg), whereas Prof. Dr. Otto Spaniol is Study Coordinator of the Media Informatics programme and Dr. Jürgen Rapp serves as study advisor. Main highlights of the year 2004 include:

- Seven of the nine endowed professorships funded by the B-IT Foundation are now filled, as two further Full Professors and two further Associate Professors joined the B-IT Faculty. For RWTH Aachen University, Prof. Dr. Thomas Rose, leader of the Business Process group at Fraunhofer FIT, was appointed as Associate Professor of Media Processes in addition to Professors Borchers and Kowalewski who had already joined in 2003.
- In February 2004, NRW Minister of Research Hannelore Kraft signed cooperation treaties with the Chinese provinces of Jiangsu and Sichuan during her visit to China on which she was accompanied by Prof. Jarke. The treaty foresees pre-selection of top students for the B-IT master programmes by these provinces which proved already highly effective for the 2004 class. During the visit, relationships to some of the top Chinese federal universities, including the first-ranked Qinghua University, could also be established and also led to recruitment of top students. Countervisits by the provincial and federal governments confirmed the promising path of the cooperation.
- In September 2004, the Media Informatics programme, together with the Software Systems Engineering curriculum at RWTH Aachen University and the Computer Science departments of the Universities of Trento (Italy) and Edinburgh (UK), was awarded a prestigious Erasmus-Mundus joint European master programme as one of only two successful applications in the computer science field. This programme, called the European Master of Informatics (EuMI), will enable us for the next five years to support top extra-European students with quite generous stipends.
- In October 2004, B-IT was finally - after more than a year of renovations - able to move into the beautiful B-IT building overlooking the River Rhine.
- In November 2004, the B-IT Universities Institute master programmes on Media Informatics and Life Science Informatics underwent a successful accreditation audit by ASIIN, the internationally recognized German accreditation agency for engineering, computer science, and the natural sciences.

After taking on the first full group of master students in the fall of 2003, the total number of students grew to about 130 when the class of 2004 joined B-IT in October, 2004. Undergraduate degrees of our students stem from more than 25 countries worldwide, with the largest groups coming from China and India.
The mission of the Fraunhofer FIT Institute for Applied Information Technology in Birlinghoven Castle and Aachen is to support human-centered computing in the context of organizational processes. Researchers in FIT study lifecycle-wide methods for the design and evolution of adaptive, user-oriented information and cooperation systems in the interplay of human work practice with organizational processes. With a research staff of about 80, plus about the same number of student researchers, FIT pursues its mission in three major research areas which are complemented by special business fields and competence centers (see www.fit.fraunhofer.de for details):

- **FIT.CSCW** (leader: Prof. Dr. Wolfgang Prinz) investigates the field of Cooperation Systems. In 2004, several major case studies were completed in cooperation with major companies such as Metro, concerning the integration of cooperation and knowledge management. In cooperation with WDR (R. Yogeshwar), a very successful worldwide CSCW experiment with 650 school classes was set up in the context of the Venus Transit in front of the sun in June 2004. In the more technically advanced field of cooperative augmented reality where FIT has developed its own implementation framework called Morgan, several large EU projects were started, addressing the novel issues of Pervasive Gaming and Augmented museum exhibits.
• **FIT.LIFE** (leader: Prof. Dr. Thomas Berlage) investigates the field of Life Science Informatics, addressing navigational support for micro-surgery, systems environments for large-scale bioinformatics research, and assistive devices for users with special needs. Jointly with RWTH’s Informatik V and FIR institutes, an IBM Shared University Grant awarded in late 2004 provides the technical infrastructure. The FIT.BIKA competence center on barrier-free internet access (leader: Dr. Carlos Velasco) completed the development of an automated checker that can diagnose the accessibility of very large websites with thousands of pages in a short time and was successfully commercialized in 2004 under the name of Imergo. In addition, the BIKA group was awarded two large new European projects, addressing an infrastructure for hearing-based communication in Europe and advanced accessibility research. Another European project that addressed the use of biofeedback measurements for learning-impaired pupils, was successfully completed in 2004.

• **FIT.ICON** (leader: Prof. Dr. Reinhard Oppermann) develops context-adaptive and mobile systems for eLearning and mobile work. Jointly with Informatik V, they are main partners in the ProLearn European Network of Excellence in Professional Technology-Enhanced Learning; other large eLearning projects include the RAFT EU projects on integration of field trips in high school eLearning and the AILB project which develops novel tools to enhance the basic professional competencies for hearing-impaired young workers; the latter is a joint project with the DESIRE research team at RWTH Aachen University led by Prof. Dr. Ludwig Jäger. Contextualization in mobile work settings is also the main topic of the MICA project that was recently started to make the SAP software environment more flexibly usable, and of a project with the new Telekom Labs in Berlin that addresses end-user development of advanced phone functionalities.

The FIT group in Aachen is led by Dr. Andreas Becks and addresses information management aspects in business and engineering processes. One major project is the SEWASIE EU project which builds semantic web infrastructure for electronic business in cooperation with Informatik V, an Aachen-based software house, and a number of partners in Italy. Another effort, in cooperation with the Japanese Ricoh corporation, addresses the media change between paper-based and electronic information media in business processes and cooperates closely with the chemical engineering projects at Informatik V. This work is embedded in the Business Process and Decision Support business field at Fraunhofer FIT which is coordinated by Prof. Dr. Thomas Rose. Another project of this group, the Europe-wide citizen information system for air pollution Apnee-Tu, received high attention from the federal government as well as industry leaders as one of the first personalized mobile information systems delivered through mobile phones and was selected as one of the finalists for the Public-Private Partnership award in 2004.
Through these research activities, and through the teaching cooperation in the context of the Bonn-Aachen International Center for Information Technology (B-IT), Fraunhofer FIT has substantially deepened its ties to RWTH Aachen University in 2004.

The Apnee-Tu air pollution citizen information system was successfully demonstrated to government and business leaders such as Kai-Uwe Ricke (Deutsche Telekom) at CeBIT 2004.