

- **Mobile Web in Developing Countries (December 2006)**

This workshop, sponsored by INRIA and TNO, brought together experts in mobile Web technologies and specialists on emerging countries and the digital divide. Its aim was to understand the people's needs and expectations, and the specific challenges and issues of accessing the Web from a mobile phone as a primary and often sole platform, so that the potential of resolving the divide becomes reality.

More workshops in 2006 at <http://www.w3.org/2003/08/Workshops/#y2006>

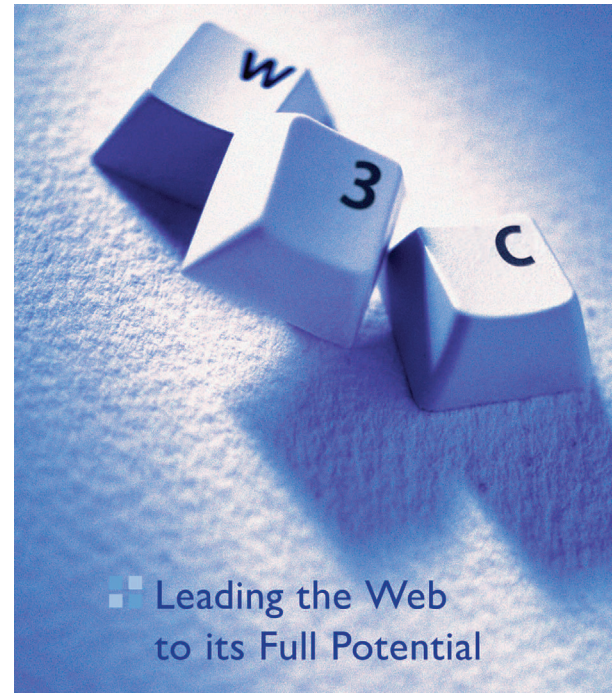
W3C Office in Mainland China

W3C launched its China Office on 27 April 2006 and hence invites experts in China to join the international project of developing Web standards at W3C. The Office is based at the Advanced Computing Technologies, School of Computer Science & Engineering of Beihang University in Beijing, China.

W3C Celebrated Ten Years with Style

On 17 December 1996, W3C published the first standard for style on the Web: Cascading Style Sheets (CSS), level 1. CSS Web designers have since enjoyed fine-grain control of page appearance (fonts, colors, layout, margins, etc.) and easier page design and maintenance. CSS can also help make pages more adaptable to more users, including users with mobile devices and some users with disabilities.

<http://www.w3.org/>



■ ■ **Leading the Web
to its Full Potential**

About the World Wide Web Consortium

The World Wide Web Consortium (W3C) is an international consortium where Member organizations, a full-time staff, and the public work together to develop Web standards. W3C's mission is: "To lead the World Wide Web to its full potential by developing protocols and guidelines that ensure long-term growth for the Web."

W3C develops Web Standards and Guidelines

W3C primarily pursues its mission through the creation of Web standards and guidelines. In its first ten years, W3C published more than ninety such W3C Recommendations. W3C also engages in education and outreach, develops software, and serves as an open forum for discussion about the Web. In order for the Web to reach its full potential, the most fundamental Web technologies must be compatible with one another and allow any hardware and software used to access the Web to work together. W3C refers to this goal as "Web interoperability." By publishing open (non-proprietary) standards for Web languages and protocols, W3C seeks to avoid market fragmentation and thus Web fragmentation.

W3C is an International Consortium

Organizations located all over the world and involved in many different fields join W3C to participate in a vendor-neutral forum for the creation of Web standards. W3C Members and a dedicated full-time staff of technical experts have earned W3C international recognition for their contributions to the Web.

W3C Members, staff, and invited experts work together to design technologies to ensure that the Web will continue to thrive in the future, accommodating the growing diversity of people, hardware, and software. W3C's global initiatives also include nurturing liaisons with over forty national, regional and international organizations around the globe. W3C operations are jointly administered by the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL) in the USA, ERCIM and Keio University in Japan.

W3C Members

Organizations join W3C to work and exchange ideas with more than 400 Members, including the world's fore-

most technology companies, coming from more than 40 countries, with a broad range of interests. W3C recently instituted a number of changes to its fee structure to encourage participation from organizations in developing countries as well as from EU-funded projects.

W3C Members take a leadership role in the future of the Web, promote their image as innovators participating in a standards body international in mission and impact, and gain early insight into market trends.

W3C Members include vendors of technology products and services, content providers, corporate users, research laboratories, standards bodies, and governments, all of whom work to reach consensus on a direction for the Web. Adoption of W3C standards and reliance of global commerce and information exchange upon W3C Web standards continue to grow. Members have a unique opportunity to participate directly in the revolution that continues to change the way the world works and people live.

Projects

ERCIM has been participating either as coordinator or as a partner in thirteen European Commission funded research projects in 2006, and in two projects starting in January 2007. Within these projects, ERCIM institutes and their partners carry out joint research activities, while the ERCIM Office carries out the administrative and financial coordination.

The main purpose of ERCIM is to foster cooperative work between its members while individual ERCIM member institutes also have their own R&D projects with international partners.

Ensuring the management of common research projects is a real asset, and this activity has become increasingly important for the ERCIM Office which is now dedicating considerable efforts to ensure the administrative and financial coordination of European projects. Relying on a small (hence reactive) and experienced team, the Office has a full range of expertise from the identification of funding opportunities to the development of project ideas, the finding of project partners, proposal writing, contract negotiation and project management. In these projects, the ERCIM Office ensures the financial and administrative coordination and usually carries out the project dissemination activities. This is a key success factor, allowing research teams to focus on the scientific tasks at the core of each project.

Coordinating several projects, ERCIM has witnessed the emergence of a growing number of research initiatives involving strong interdisciplinary activities. If this has been a growing trend over the year, the European research projects now go a step beyond with the integration of advanced Information Communication Technologies to other domains. The use of Grid technologies in Digital Libraries (DILIGENT), health technologies (ACGT), communities of practices (Palette) illustrates this trend.

Interdisciplinarity makes projects more difficult to manage. European projects now involve at least two distinct communities with different backgrounds, and ensuring their close collaboration is not an easy task. The first problem met is to get scientific and non-scientific communities to understand each other. The collaboration of teams is now requiring more time than in past projects. Yet, this multidisciplinary dimension is a key ingredient to avoid empty-nutshell technology and to ensure the European projects have concrete results in the every day life.

The European Commission is now implementing its vision of the Information Society in which ICT are used to address real life scenarios across a wide array of domains. This is also a significant way to ensure that the fall-outs of European research will have a stronger impact towards the European citizens.

ERCIM has been involved in thirteen European contracts funded by the European Commission in 2006. Two new research contracts have been accepted by the European Commission and started in 2007. They can be categorized as follows:

- five 'Integrated Projects': VITALAS, ACGT, DILIGENT, PALETTE, MODTRAIN
- three 'Networks of Excellence': CoreGRID, DELOS, MUSCLE
- two 'Specific Targeted Research Projects' (STREPs): GridCOMP, Net-WMS
- three 'Coordination Actions': Beyond-The-Horizon, InterLink, ENGAGE
- two 'Specific Support Actions' (SSAs): Grid@Asia and EchoGRID.

All contracts, except two of them – Modtrain and ENGAGE – have been coordinated by the ERCIM Office.

Seven new European Commission funded research contracts started in 2006 and in January 2007:

- ACGT, an Integrated Project on Genomic Clinical Trials on Cancer
- VITALAS, an Integrated Project to provide advanced solution for indexing, searching and accessing large scale digital audio-visual content
- The Integrated Project "PALETTE" (Pedagogically sustained Adaptive Learning through the exploitation of Tacit and Explicit Knowledge)
- GridComp, a STREP to produce the invisible Grid
- Net-WMS - Networked Businesses in Warehouse Management Systems, a STREP initiated by the ERCIM Working Group Constraints
- InterLink, a 'Coordination Action' to continue the Beyond-The-Horizon project at an international level
- EchoGRID, a SSA to continue the Grid@Asia activities in China.

VITALAS

VITALAS is an innovative project designed to provide advanced solution for indexing, searching and accessing large scale digital audio-visual content. The VITALAS project is a 'spin-off' from the ERCIM-coordinated MUSCLE Network of Excellence.

VITALAS plans to deliver a reliable and efficient pre-industrial prototype, allowing intelligent access to multimedia professional archives. The VITALAS technology will not only be applied in B2B applications, but will also reach out for larger public adoption, by addressing consumers' need for efficient and reliable multimedia content search engines.

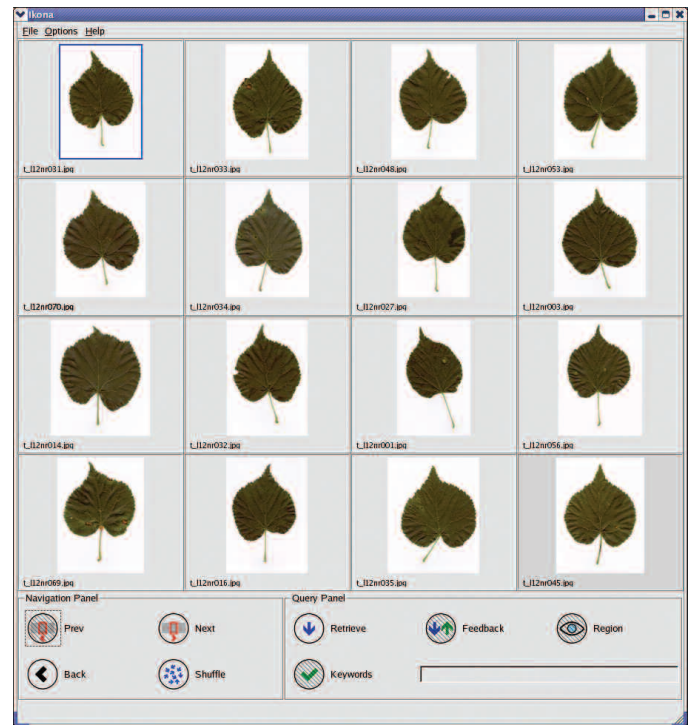
Major Challenges

VITALAS will address the following major challenges:

- **Cross-media indexing and retrieval methods:** Efficient cross indexing methods will be developed through semi-automatic multimedia content annotation using several media inputs. VITALAS will put forward appropriate probabilistic retrieval techniques. Advanced hybrid relevance feedback model will be investigated to provide better user target retrieval. Unlike many approaches developed in other ongoing projects, VITALAS will not consider ontology-based methods but machine learning methods together with the development of more informative new content description methods. VITALAS is among rare projects that consider all media inputs (visual, textual and audio).
- **Interactivity and context adapting:** considering the preliminary use-cases expressed by our content provider partners, adapting the search space to the user profile and providing interactive functionalities to control the results is highly expected. Interactive cartographies and video synthetic views should allow users to give feedback, analyse and manipulate the results according to the task being achieved. Off-line user profiles and on-line personalisation will be used also to provide more user satisfaction by expressing their subjective preference.
- **Search scalability issue:** Technologies enabling search in very large and heterogeneous databases will be one of the main target challenges of VITALAS. The system validation will be performed on real and alive databases, up to 10,000 hours of television archives and several tens of millions of political/societal news content images.

The functionalities of VITALAS system will be specified and validated by major European multimedia content providers, in conjunction with the academic and the industrial partners of the project. Thanks to the important effort spent on this point, VITALAS expects relevant and usable technology at the end of the project. The evaluation issues will be carefully addressed by the definition and selection of test corpora, success criteria statement and external user trials. The principle of VITALAS is that such kind of professional usage validation is an essential milestone before an extension to mass market applications (general public). Both internal and vocational training will therefore be undertaken to bring the user community to interact with the VITALAS system.

The VITALAS functionalities will provide the core system and technologies for intuitive multimedia search engine services, currently facing strong technological bottleneck. This technology could also be adapted to mobile platforms with further collaboration with partners having expertise in mobile technologies and networked systems.



Indexing, navigation and browsing in large multimedia data streams is a major challenge of the VITALAS project. This example shows an application to identify a tree species, using a leaf shapes taken from the Swedish Leaves database. Source: INRIA IMEDIA research team.



Video & image Indexing and Retrieval in the Large Scale, an Integrated Project funded by the Information Society Technology Programme of the European Commission

ERCIM members involved:
INRIA, CWI, Fraunhofer IAIS

ERCIM's role:
administrative coordinator

Scientific coordination:
Nozha Boujemaa (INRIA)

EC funding: €4,690,000

Duration:
January 2007 - December 2009

<http://vitalas.ercim.org>



MUSCLE at the CeBIT fair.



Multimedia Understanding through
Semantics, Computation and Learning

Multimedia Understanding through Semantics, Computation and Learning,

a 'Network of Excellence' supported
by the Information Society
Technologies programme of the
European Union

EC funding: €6,900,000

ERCIM's role:
administrative coordinator

ERCIM members involved:
CWI, ISTI-CNR, ICS-FORTH,
INRIA, SZTAKI, University College
Dublin (UIA), Trinity College Dublin
(UIA), Seibersdorf Research
(AARIT), Universitat Politecnica de
Catalunya (SpaRCIM), Institute of
Information Theory and Automation,
Czech Republic (CRCIM), VTT

Scientific coordination:
Nozha Boujemaa (INRIA)

Duration:
March 2004 - February 2008

<http://www.muscle-noe.org/>

MUSCLE

MUSCLE - Multimedia Understanding through Semantics, Computation and Learning - is a Network of Excellence (NoE) that aims at establishing and fostering closer collaboration between research groups in multimedia data mining and machine learning. The Network integrates the expertise of over forty research groups working on image and video processing, speech and text analysis, statistics and machine learning. The goal is to explore the full potential of statistical learning and cross-modal interaction for the (semi-)automatic generation of robust meta-data with high semantic value for multimedia documents.

In 2006, the MUSCLE NoE has successfully integrated four new partners, namely UPMC (France), UPS-IRIT (France), EC3 (Austria) and NUID/UCD (Ireland).

The main objective during the third year of activity was to conduct the revised joint programme of activities towards completion. The underlying objective focused on more integration and more scientific dissemination of MUSCLE partner's results. Since the network entered the second half of its lifecycle it became therefore more important to engage outside parties, and industry in particular.

MUSCLE consortium aims at intensifying its knowledge transfer and industry-driven technology pull which should provide opportunities to disseminate to larger community as well as forge new research partnerships in FP7. To raise interest and awareness from industry, MUSCLE launched several showcases - internal projects destined to deliver highly visual results with a good market potential. This showcasing activity should stimulate the uptake of MUSCLE technology by the industrial stakeholders in the field, and help to bring integration a step further.

MUSCLE demonstrated its showcases at the CeBIT fair in Hannover, Germany in March 2007, at the Practitioner Day of CIVR 2007 in Amsterdam in July 2007, and plans to present its results to forthcoming professional exhibitions such as the IBC exhibition, etc.

At the same time, while focusing its efforts on external dissemination, collaboration between partners has been strengthened by successful implementation of e-Team groups.

Main achievements in 2006

- Implementation of an internal fellowship programme providing advanced training to future researchers. In 2006, new fellows integrated the Internal MUSCLE Fellowship Programme.
- The launch of "showcase projects" to demonstrate the multimedia expertise of the different teams involved in the network, with a particular dissemination focus on the industry. .
- MUSCLE e-teams have been re-defined to address core scientific challenges in the field of Multimedia understanding. The E-teams are currently focusing on: "Evaluation, Integration and Standards", "Visual Content Indexing", "Content Description for Audio, Speech and Text", "Multimodal Processing and Interaction" and "Machine Learning and Computation Applied to Multimedia Description".
- The MUSCLE web site (<http://www.muscle-noe.org/>) has been redesigned and provides an overview of the main activities and events of MUSCLE, the integration activities, and particularly the description of the showcases

MUSCLE and DELOS NoE organised a very successful "Joint DELOS - MUSCLE Summer School on Multimedia Digital libraries, Machine Learning and Cross-Modal Technologies for Access and Retrieval on 12-17 June 2006 in San Vincenzo, Italy. The school promoted advanced experiences and implementations and to improve knowledge in these fields.

ACGT

ACGT - Advancing Clinico-Genomic Clinical Trials on Cancer - will develop a bio-medical Grid infrastructure supporting seamless mediation services for sharing clinical and genomic expertise. Such interactions will allow joint clinico-genomic trials and help finding quicker and efficient routes to identifying patients' individual characteristics that make one treatment more appropriate than another. The project was prepared in the frame of the ERCIM Working Group "Biomedical Informatics".

The completion of the Human Genome Project sparked the development of many new tools for today's biomedical researcher to use in finding the mechanism behind disease. While the goal is clear, the path to such discoveries has been fraught with roadblocks in terms of technical, scientific, and sociological challenges.

The underlying motivation of ACGT is to provide researchers and practitioners with optimal means and resources to fight cancer. Imagine that for selected cancer patients, biopsies are taken before, during and after treatment, made anonymous and the analyses are stored promptly in an accessible fashion. Imagine also that the patient's data can readily be compared with those from other trials. And imagine that one can drill down into clinical and other databases in an intelligent search in hours rather than months. This might lead to the rapid identification of cancer profiles, and of their corresponding optimal therapy. To realise this vision, ACGT brings together internationally recognised leaders in their respective fields, with the aim to deliver to the cancer research community an integrated clinico-genomic ICT environment enabled by a powerful Grid infrastructure. ACGT has formulated a coherent, integrated workplan for the design, development, integration and validation of all technologically challenging areas of work:

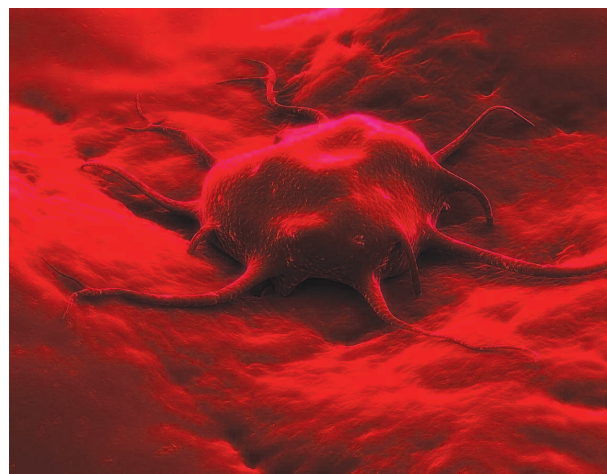
- delivery of a European bio-medical Grid infrastructure offering seamless mediation services for sharing data and data-processing methods and tools, and advanced security
- semantic, ontology based integration of clinical and genomic/proteomic data - taking into account standard clinical and genomic ontologies and metadata
- delivery of data-mining Grid services in order to support and improve complex knowledge discovery processes.

The technological platform will be validated in concrete settings of advanced clinical trials on cancer. Pilot trials have been selected based on the presence of clear research objectives, raising the need to integrate data from all levels of the human being.

ACGT promotes the principle of open source and open access, thus enabling the gradual creation of a European biomedical Grid on cancer. Hence, the project plans to introduce additional clinical trials during its lifecycle. It is in line with the priorities and objectives of the IST programme. It targets at the fulfilment of urgent needs of the cancer research community, a key area of societal importance.

The project has made significant progress in 2006. Requirements have been gathered, elicited and analysed. A range of post-genomic 'scenarios' have been defined, as well as the initial functional architecture for the development of the ACGT infrastructure. In the general ACGT environment, the workflow authoring and management tasks play a central role as a means to support the end-users knowledge discovery processes. Therefore the ACGT architecture also supports the publication, discovery, invocation, and management of scientific workflows and it will be further elaborated during the course of the project. An inventory of the ACGT tools and services has been compiled and assignments for implementation been made.

Crucial technical decisions, related to technologies and standards to be adopted, have been taken. Initial implementations of key architectural components, e.g. the ACGT Master Ontology, the ACGT Mediator, the ACGT basic and advanced Grid layer, Data access services for access to certain types of biomedical data, the ACGT portal, etc are already available.



The ACGT project will develop a Grid platform to support exchanges of clinical and genetic information, with a particular focus on breast cancer.



Advancing Clinico-Genomic Clinical Trials on Cancer: Open Grid Services for Improving Medical Knowledge Discovery, an Integrated Project funded by the 6th Framework Program of the European Union

EC funding: €1,887,000

ERCIM's role:
administrative coordinator

ERCIM members involved:
ICS-FORTH, INRIA, Fraunhofer-Gesellschaft

Scientific coordination:
Manolis Tsiknakis (ICS-FORTH)

Duration:
February 2006 - January 2010

<http://www.eu-acgt.org/>



Providing technology and services for communities of practice.



Pedagogically sustained Adaptive Learning through the exploitation of Tacit and Explicit Knowledge, an Integrated Project funded by the Information Society Technology Programme of the European Commission

ERCIM members involved:

INRIA, Centre de Recherche Public Henri Tudor (FNR), EPFL (SARIT), University of Fribourg (SARIT), Université de Liège (FWO & FNRS)

ERCIM's role:

administrative coordinator

Scientific coordination:

Christine Vanoirbeek (EPFL / SARIT)

EC funding: €6,000,000

Duration:

February 2006 - January 2009

<http://palette.ercim.org>

PALETTE

The IST European Integrated Project 'PALETTE - Pedagogically sustained Adaptive Learning through the Exploitation of Tacit and Explicit Knowledge' develops a set of innovative, interoperable and standard-based services that enhance learning in communities of practice.

A community of practice is a frequently interacting group of people (the community) who share a concern, a set of problems, or a passion about a topic (the domain of the community), and who deepen their practical knowledge and expertise in that domain (the practice of the community).

Such communities are recognised as effective environments for supporting the learning of professionals, organisations and educational institutions. They have several characteristics that distinguish them from formal organisations. Collaborative learning is a key issue: members learn from each other by making their knowledge and practices explicit, sharing them with their peers, and reflecting on them. The rapid development of new technology such as Web-based platforms, wireless communications, mobile devices and multimedia content, means that great potential exists for such applications. However, recent research underlines a lack of adequate scaffolding in the form of technical support, and use of the technology to:

- express, represent and share practices and authentic problems
- debate and reflect on the practices and life of communities
- develop, reify and exploit knowledge inside and outside communities
- aid engagement, participation and learning.

To achieve its objectives, PALETTE will provide communities of practice with a set of services classified into three categories: information, knowledge management and mediation services. These will provide the community's participants with support for:

- data production, exchange and reuse between autonomous and heterogeneous applications
- reification of explicit and tacit knowledge about practices
- advanced communication and collaboration between communities.

Services will be tested using various pedagogical scenarios. In line with new learning practices, these will be designed to encourage the exploitation of diverse mental models, knowledge resources and the skills of individuals both inside and outside communities.

The PALETTE's R&D process relies on a design approach that takes into consideration the underlying processes of social participation, community building and development of identity. It is articulated around negotiation of meaning, which is the basis of any individual and collective learning process. The open-source services resulting from PALETTE will not only address the needs of communities currently involved in the project, but also provide the conditions for engagement of other communities. The participation of further users is encouraged, as it will enhance the project and contribute to its development.

With a good balance between technological and pedagogical experts, the consortium aims to provide support for a broad range of activities performed by communities of practice. The project must therefore deal with different types of information, make use of various applications and accommodate several environments. An important challenge is to provide users with interoperable tools allowing exchange of data, and to integrate them into different scenarios of use. Interoperability covers several levels, addressing technological considerations (use of XML and related technologies), organisational constraints, and higher-level understanding of manipulated information. This can include agreement on data exchange models and associated semantic information, through ontologies and standards used in the learning domain. The PALETTE project intends to provide innovative learning models and technical solutions that increase the overall quality of learning in communities of practice. In addition, it will contribute to the development of standards in this area.

Net-WMS

Net-WMS - Towards integrating Virtual Reality and optimisation techniques in a new generation of networked businesses in Warehouse Management Systems (WMS) under constraints - is a new project managed by ERCIM, developing interactive optimisation tools and prototype software that will form the basis for a new generation of networked services for WMS.

Net-WMS will handle networked communication and co-operation processes through the integration of decision-making technologies, generic 2D, 3D and higher-dimensional placement constraint solvers, visualisation and interaction with the solvers in virtual reality, packing models and knowledge modelling with business rules. Its scientific outcome will be relevant to the whole domain of combinatorial optimisation and will have direct technological impact on supply chain management at both the WMS and Transportation Management Software (TMS) levels, especially in the areas of packing, vehicle loading, space management, planning and scheduling, inventory control and packed item visualisation.

Prototype Applications

Net-WMS prototype applications will be operational in an environment of networked warehouses, thanks to their interoperability and to the user-friendly interface designed for plant-level technicians. They will include innovative tools and plug-ins including:

- a packing modeller of items based on optimisation techniques and interactions in virtual reality
- a palletizer tool using optimisation techniques
- a dispatcher, which includes the virtualisation of a truckload
- a set of interfaces enabling communications between several planning components across a network.

The project goals are threefold. First, from a scientific standpoint, significant advances are expected on:

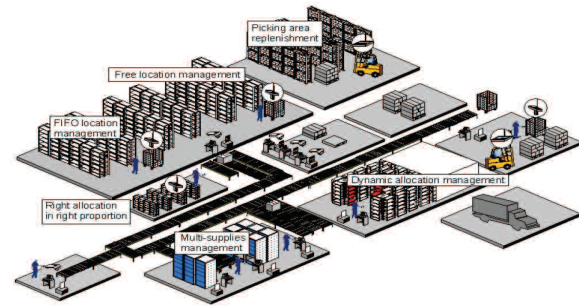
- the algorithmic treatment of global placement constraints for objects of higher dimensions including space and time
- the expression of constraint optimisation problems with a language of business rules
- the control of an optimisation tool with interactions in virtual reality.

Second, on the technological side, the project will pave the way for next-generation WMS software by applying innovative technology to enhance operations in industrial warehouse environments. This includes:

- a set of Java Platform, Enterprise Edition (J2EE) interfaces for interoperability and mobile services, enabling communications between planning components across a network
- a mobility interface, allowing remote users (eg truck drivers) to report planning changes
- new interactive modules combining constraint programming, rule programming and virtual reality, in support of modelling, simulation and optimisation of the packing process
- a set of high-level modelling libraries for the constraint programming system Choco
- extensions to rule programming tools such as constraint handling rules (CHR) and Drools.

Third, on the commercial side, Net-WMS aims at improving European competitiveness in the area of warehouse management by significantly reducing costs related to packing, manpower and transportation.

Net-WMS commenced in September, 2006 and will be active for three years. The consortium has a combined expertise and field knowledge that guarantee the project will reach its objectives. It is composed of ten members representing both academia and industry including the ERCIM members INRIA and SICS.



Example of an industrial warehouse powered by GILDAS WM, a warehouse management system from KLS Logistic System (Grenoble, France).

NET WMS

Networked Businesses in WMS

Towards Integrating Virtual Reality and Optimisation Techniques in a New Generation of Networked Businesses in Warehouse Management Systems (WMS) under Constraints, a 'Specific Targeted Research Project' supported by the Information Society Technologies programme of the European Union

EC funding: €2,320,000

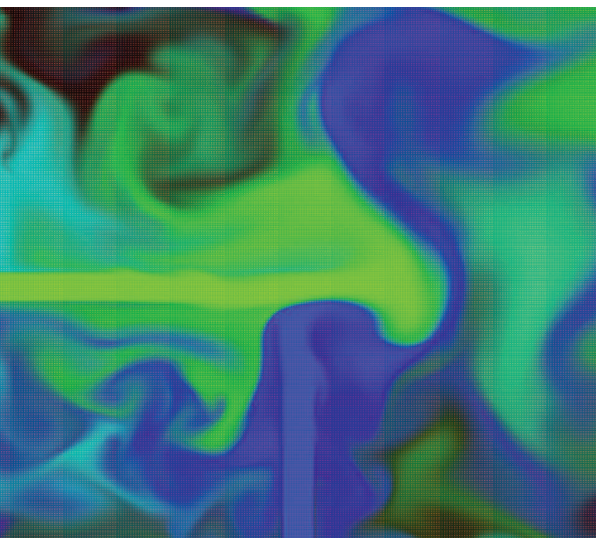
ERCIM's role:
administrative coordinator

ERCIM members involved:
INRIA, SICS

Scientific coordination:
François Fages (INRIA)

Duration:
September 2006 - August 2009

<http://net-wms.ercim.org/>



Standard Grid components will make it possible to seamlessly compose applications, for example fluid flow simulations, and services deployed on large-scale infrastructures.

Image by courtesy of INRIA.

GridCOMP

Information Technologies require standards for interoperability; they are a true catalyst for scientific and business development. The GridCOMP project defines and implements a Grid Component Model (GCM) for the IT sector. Standard Grid components will make it possible to seamlessly compose applications and services deployed on large-scale infrastructures including several thousand machines all over the world.

The main goal of the GridCOMP project is the design and implementation of a component based framework suitable to support the development of efficient Grid applications. The framework will implement the 'invisible Grid' concept as it will properly abstract all those specific Grid-related implementation details that usually require high programming efforts to be dealt with. GridCOMP will take the Grid Component Model developed by the CoreGRID Network of Excellence (<http://www.coregrid.net>) as a first specification, and use the OW2 ProActive Open Source implementation (<http://www.ow2.org/>) as a starting point. OW2 ProActive Grid middleware ensures interoperability with other standards such as EGEE gLite, UNICORE, NorduGrid, Globus, and Web Services.

The GridCOMP framework will be able to interoperate with existing standards, such as Web Services. Grid application programmers could thus develop Grid applications by exploiting already existing software modules. The component model refined in GridCOMP will be designed to become a "de facto" standard. The IT companies involved in the project since the very beginning guarantee the implementation of all the features which are expected from a Grid programming framework. The use cases developed within the project will provide final assessment of the framework features, as they cover significant application fields both in scientific and business computing.

GridCOMP will leave an imprint on the European and world-wide Grid community by:

- defining a component framework using standard tools
- participating in well-known standardization bodies
- disseminating the project results and achievements to both the scientific and industrial communities
- contributing to the development of a component industry for the Grid.

GridCOMP addresses both scientific computing and Grid-based business applications. The project can reach a world-wide audience thanks to the involvement of partners from Australia, China and South America. Coordination with the Networked European Software&Service Initiative (NESSI) is a strong priority, with the involvement of OW2, Atos Origin and IBM.

Work in 2006 was mainly dedicated to the setup of the methodological framework and the initial development of tools addressing the ambitious scientific and technological objectives of the project. In parallel, significant efforts have been made to establish the communication framework between partners, as well as to advertise, disseminate and promote the project.



Grid Programming with Components : An Advanced Component Platform for an Effective Invisible Grid, a 'Specific Targeted Research Project' supported by the Information Society Technologies programme of the European Union

EC funding: €1,750,000

ERCIM's role:
administrative coordinator

ERCIM members involved:
INRIA, ISTI-CNR

Scientific coordination:
Denis Caromel (INRIA)

Duration:
June 2006 - November 2008

<http://gridcomp.ercim.org/>

MODTRAIN

MODTRAIN stands for 'Innovative Modular Vehicle Concepts for an Integrated European Railway System', and as Integrated Project it is the first of its kind in the area of joint European railway research. MODTRAIN will define and prove the necessary functional, electrical and mechanical interfaces and validation procedures to deliver the range of interchangeable modules, which will form the basis for the next generation on intercity trains and universal locomotives.

The concept of modularity aims at economic advantages for both railway suppliers and operators, such as reduced manufacturing cost and economies of scale, increased productivity of new rolling stock as well as increased reliability founded on a rise in proportion of service-proven components in new rolling stock designs. The project's economic advantages together with the technical solutions fulfil the objectives of increased railway competitiveness and interoperability defined in the agenda for the European Rail Research Advisory Council (ERRAC) and in the First and Second Railway Packages enacted by European Union legislation.

As a starting point, MODTRAIN will concentrate on fixed-formation passenger trains and universal locomotives capable of 200 km/h or more. As the programme advances, it hopes to extend the scope to embrace all rolling stock likely to operate over both the high-speed and conventional interoperable networks across Europe.

Budget and Partners

As an Integrated Project, MODTRAIN has a total budget of about €30,4 million, of which €16,9 million are financed by the European Union's 6th Framework Programme for Research and Technological Development. The second share of about €13,5 million is financed by the 37 project partners.

Together with the European Commission, the contracting partners of MODTRAIN include the system integrators Alstom, AnsaldoBreda, Bombardier and Siemens, the railway operators DB, SNCF and Trenitalia, various railway subsystem suppliers of different branches and sizes as well as railway research centres and universities. Many other suppliers and operators are represented via the Association of European Railway Industries (UNIFE), the International Union of Railways (UIC) as well as the national rail industry associations ANIE (Italy), FIF (France), RIA (UK) and VDB (Germany).

The starting point for the project will be the continuous collaboration between the suppliers and operators to determine the necessary functional and physical interfaces, requirements and validation procedures. These will then form a reference for the design and development of the range of interchangeable locomotive and rolling stock modules. The operators will assess, amend and approve the specifications as they emerge. Finally, at the end of the project, open standards for the interfaces of significant train components should be put in place.

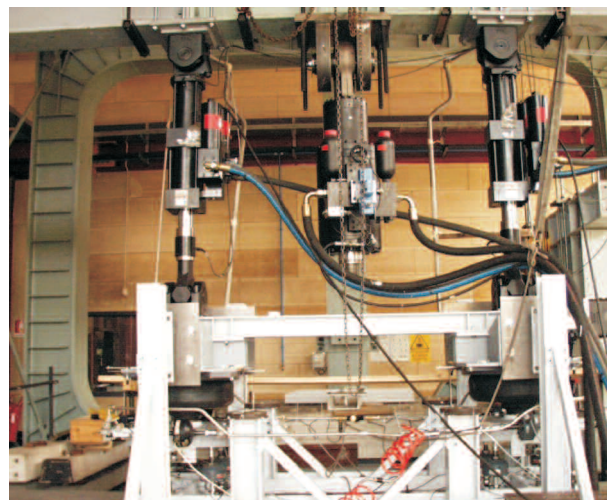
The technical and scientific work of the project addresses four principle elements, which are structured as their own Subprojects:

- MODBOGIE - Running gear
- MODCONTROL - Control and monitoring system
- MODPOWER - On-board power system
- MODLINK - Man-machine and train-to-train interfaces.

The dissemination policy and information to all railway stakeholders is organised within the 5th Subproject MODUSER, the MODTRAIN User Platform.

Further Developments

MODTRAIN has paved the way to corollary projects such as MODBRAKE, which aims at contributing to the practical implementation of interoperability of railway systems across Europe by addressing brake system performance.



A demonstrator for the characterisation of dynamic behaviour of secondary railway suspension systems used at Politecnico di Milano, developed in the frame of the subproject "MODCONTROL".

MODTRAIN 

Innovative Modular Vehicle Concepts for an Integrated European Railway System, an 'Integrated Project' supported by the Information Society Technologies programme of the European Union

EC funding: €16,900,000

ERCIM's role: project partner

ERCIM members involved: ISTI-CNR
Fraunhofer-Gesellschaft

Duration: February 2004 - January 2008

<http://www.modtrain.com/>

InterLink

Following the very successful Coordination Action 'Beyond-The-Horizon', the purpose of the newly launched EU Coordination Action 'InterLink' - International Cooperation Activities in Future and Emerging ICTs - is to promote collaboration and partnerships in a number of strategic research areas in future and emerging Information and Communication Technology.

InterLink aims at advancing Europe's knowledge in these areas, at promoting European solutions and knowledge worldwide, and at influencing the way in which research in these areas will evolve internationally. It will therefore carry out activities and provide means and support mechanisms to encourage cooperation between European and non-European research communities in strategic basic research areas related to Information Society Technology (IST). Three thematic areas have been carefully selected. These are based on the need to address both the evolution of the information society in the next ten to fifteen years, and the challenges this will impose on research in computing, software engineering, cognition and intelligence. These thematic areas, which are also closely linked to ERCIM's areas of strength, are:

Software Intensive Systems and New Computing Paradigms:

The continuing decrease in the cost of microprocessors and storage is leading to the development of increasingly distributed and decentralized systems. Society's dependence on software-intensive systems is increasing rapidly, both in the economic sector and in daily life. Applications will be assembled as dynamic federations of autonomous and evolving components. In this context, new computing paradigms and techniques are required to build software-intensive systems.

Ambient Computing and Communication Environments:

The evolution of the information society is characterized by the development of personalized individual and collective services. These exploit infrastructures situated in smart environments and are based on a range of ubiquitous and pervasive communication networks that provide ambient computing at multiple levels. The underlying vision of pervasive and ambient computing assumes very large numbers of 'invisibly' small computing devices embedded in the environment. Such devices would interact with multiple users in a wide range of dynamically changing situations, and be supported by an infrastructure of intelligent sensors (and actuators) embedded in the built environment. The realization of this vision requires advances in various areas of Information and Communication Technology (ICT), and necessitates highly multidisciplinary research.

Intelligent and Cognitive Systems:

Cognitive systems should be able to interpret data arising from real-world events and processes, acquire situated knowledge of their environment, act, make or suggest decisions, and communicate with people on human terms. The design of cognitive artificial systems requires coordinated and integrated research efforts that span a wide range of disciplines and require collaborative resources that can be achieved only through long-term, multidisciplinary research activities.

InterLink is based on three working groups, one for each thematic area, that will work in a coordinated fashion. Working groups consist of international teams of researchers with internationally recognized expertise in their fields of research. Several workshops will be organized during the project to foster RTD dialogue and promote interaction within each working group. Ultimately, InterLink will lead to the elaboration of a technology roadmap on an international scale in each thematic area.

The opening workshop for InterLink was organised by ERCIM on 10-12 May 2007 in Eze, France.



International Cooperation Activities in Future and Emerging Information and Communication Technologies,
a 'Coordination Action' funded by the Future and Emerging Technologies (FET) activity of the European Union

EC funding: €900,000

ERCIM's role:
administrative coordinator

ERCIM members involved:
ICS-FORTH, Fraunhofer-Gesellschaft

Scientific coordination:
Constantine Stephanidis
(ICS-FORTH)

Duration:
October 2006 - March 2009

<http://interlink.ics.forth.gr/>

CoreGRID

The CoreGRID Network of Excellence (NoE) aims at strengthening and advancing scientific and technological excellence in the area of Grid and Peer-to-Peer technologies. To achieve this objective, the Network brings together a critical mass of well-established researchers (155 permanent researchers and 168 PhD students) from forty-one institutions who have constructed an ambitious joint programme of activities.

CoreGRID's joint programme of activity is structured around six complementary research areas that have been selected on the basis of their strategic importance, their research challenges and the recognised European expertise to develop next generation Grid middleware, namely:

- knowledge & data management;
- programming models;
- architectural issues: scalability, dependability, adaptability;
- Grid information, resource and workflow monitoring services;
- resource management and scheduling;
- Grid systems, tools and environments.

The Network is operated as a European Research Laboratory having six institutes mapped to the areas that have been identified in the joint programme of activity. The network is thus committed to set up this Laboratory and to make it internationally recognised and sustainable. It is funded by a European grant assigned to the CoreGRID NoE, for a duration of four years to cover the integration costs, while the network partners cover the expenses required to perform the research associated with the joint programme of activities.

In 2006, CoreGRID became the European beacon for Grid research. It reached a very high level of scientific excellence, which is reflected by the more than 200 joint technical papers accepted in peer-review conferences, workshops and journals. The network is structured in six research Institutes, supported by a set of horizontal integration activities.

In the years to come, the network is committed to advancing further towards sustainable integration by actively involving industrial stakeholders in defining the roadmaps and strategies to achieve economic impact. In the next years these endeavours will continue to increase the impact of the remarkable academic results on European industrial competitiveness.

The expected result is a sustainable European research community, highly visible in the international research arena, in the fields of Grid and P2P technologies (CoreGRID aims at staying alive well after the ending of its initial EU funding). It is anticipated that after four years of existence, CoreGRID will have made determinant contributions to the Next Generation Grid vision, one much broader than today's. CoreGRID's vision of the Grid will allow an end-user to interact with the system to specify a request and the system will respond with a 'deal' that the user may accept or reject. The deal will encompass different kinds of resources, including data, information and knowledge, sensors or particular computing equipment such as visualisation systems, as well as computational resources.

The annual CoreGRID Summer Schools are the main training activities of the network. The 2006 CoreGRID Summer School was organised by the Fraunhofer Institute for Algorithms and Scientific Computing (SCAI), on 24-28 July 2006. The school theme was "Current and Future Generation Grid Technology". A total of 55 participants met at the Bonn-Aachen International Centre for Information Technology (B-IT). They took part in nine lessons and practical sessions provided by twelve lecturers from the CoreGRID NoE, six from other European projects, one from the Open Grid Forum (OGF), one from Globus Alliance and five from industry.



Participants of the the CoreGRID summer school 2006.

CoreGRID

European Research Network on Foundations, Software Infrastructures and Applications for large scale distributed, Grid and Peer-to-Peer Technologies, a 'Network of Excellence' supported by the Information Society Technologies programme of the European Union

EC funding: €2,200,000

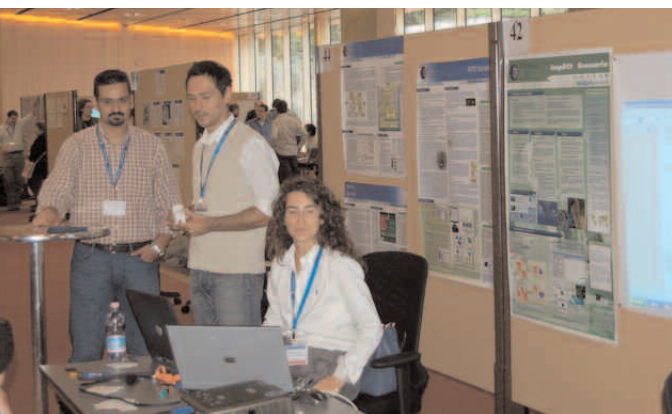
ERCIM's role:
administrative coordinator

ERCIM members involved:
ISTI-CNR, EPF Lausanne (SARIT), Fraunhofer-Gesellschaft, INRIA, Masaryk University Brno (CRCIM), STFC, SICS, SZTAKI, Université catholique de Louvain (FNRS/FWU), Technical University of Catalonia (SpaRCIM), VTT

Scientific coordination:
Thierry Priol (INRIA)

Duration:
September 2004 - August 2008

<http://www.coregrid.net/>



Diligent booth at the EGEE conference.



A Digital Library Infrastructure on Grid Enabled Technology,
an 'Integrated Project' supported by
the Information Society Technologies
programme of the European Union

EC funding: €6,300,000

ERCIM's role:
administrative coordinator

ERCIM members involved:
ISTI-CNR, ETH Zurich, Basel
University (SARIT), Fraunhofer-
Gesellschaft

Scientific coordination:
Donatella Castelli (ISTI-CNR)

Duration:
September 2004 - November 2007

<http://www.diligentproject.org/>

DILIGENT

The DILIGENT project is creating an advanced test-bed that will allow virtual e-Science communities to share knowledge and collaborate in a secure, coordinated, dynamic and cost-effective way.

The DILIGENT test-bed is being built by integrating Grid and Digital Library (DL) technologies. Merging these different technologies will lay the foundations for a next generation e-Science knowledge infrastructure with many different research and industrial applications.

The test-bed will be demonstrated and validated by two complementary real-life application scenarios: one from the environmental e-science domain and one from the cultural heritage domain. The first user community is composed of representatives from leading organisations that operate in the environmental sector; the second consists of scholars, distributed all over the world working together in a three-year project to merge the medical, humanity, social science and communication research areas. The DILIGENT infrastructure, which builds upon the efforts of the EGEE project (public.eu-egee.org/), will serve many different research and industrial applications and will be demonstrated and validated by two complementary real-life application scenarios.

In 2006 DILIGENT has deployed a new gLite infrastructure in addition to the two private Grid infrastructures already running for development and testing of the prototype DL distributed system. The aim of this new infrastructure is to provide a Grid environment to run the next stable release of the system to be used by the DILIGENT user communities for validating the ongoing DILIGENT developments. This infrastructure, running gLite 3.0, is composed of three sites: CNR-ISTI, ESA-ESRIN and ENG. It is currently providing around 30 CPUs and 3.4 TB of storage. To better test the DILIGENT user-scenario experimentations in a 'production-like' environment, DILIGENT has also proposed to join this new infrastructure to the EGEE Pre-Production Service (PPS). During the month of August 2006 two of these sites were certified by the EGEE PPS team and are now officially part of this EGEE infrastructure.

The project also announced the DILIGENT release Alpha, the first official release of the DILIGENT software. Developed under the intense coordination of seven geographically distributed teams, and integrated by another four, DILIGENT is a complex system and the release Alpha represents the achievement of a major milestone in the project. The release Alpha is the foundation infrastructure on which DILIGENT will provide on-demand digital libraries to dynamic virtual organizations by exploiting the high-computing capacities of the Grid. 82 components were integrated, packaged and made officially available in the release Alpha, together with the associated documentation. Furthermore, the release Alpha exploits a number of standards specification and application frameworks.

Demonstrators of the DILIGENT system have been made accessible through the project web site. The main features of the DILIGENT system can be experienced first-hand through six demonstrators related to three different contexts: cultural heritage, e-Science and multi-media processing. The current demonstrators target developers; decision makers responsible for strategic technological choices; and end-users, as potential members of virtual organizations, as the audience most interested in the features provided by the DILIGENT system.

EchoGRID and Grid@Asia

EchoGRID started in January 2006 and will build on the successful Grid@Asia project to foster collaboration in Grid research and technologies by defining a short-, mid-, and long-term vision in this field.

The main objectives of EchoGRID are to:

- Establish a common Grid research agenda, relying on European and Chinese experts, both from academia and industry
- consolidate this vision and promote cross-fertilisation between Grid-related projects and initiatives in Europe and China by interacting with the Grid research and industrial communities
- exchange experiences and best practices by selecting Grid Open Standards for Grid middleware and applications interoperability and by promoting the identification of guidelines for building a Standard Quality Assurance Process
- support lasting cooperation and establish tangible partnerships in the field through support activities and tools, ranging from a mobility programme for researchers, to a dedicated partner search engine.

The expected results are three, five and ten years roadmaps developing a shared European and Chinese vision of future Grid research perspectives for research and industrial communities on which both sides may collaborate. A series of conferences and workshops open to both European and Chinese participants from research, industry, government, SMEs and user communities will be held. Further, a EU-China Interoperability Grid Plugtests will be organised to test and improve interoperability mechanisms of Grid middleware.

Grid@Asia

The Grid@Asia project was designed to foster collaboration in Grid research and technologies between the European Union and Asian countries with a particular focus on China and South Korea. Relying on a core of leading European Grid research institutes, Grid@Asia has identified Chinese and South Korean key players in Grid research and technologies, organised focused workshops around EU/Asia research and industrial agendas, and established cooperation and dissemination activities.

In 2006, the Grid@Asia project co-organised the following events:

- The second Grid@Asia Workshop, 20-22 February 2006 in Shanghai, in conjunction with the "The European Commission Call 6 Information Day on International Cooperation with China".

Some 100 participants invited from European and Asian research institutes, industry and ministries of research participated to the event with the aim to foster cooperation with significant Grid actors within the European 6th and 7th Framework Programme (FP). This workshop was the second of a series of strategic workshops in Asia in the frame of the Grid@Asia initiative

- The third Grid@Asia and GFK 2006 International Joint Workshop

Some 150 representatives from European and Asian research institutes, industry and ministries of research participated in the Grid@Asia workshop in Seoul on 11-13 December 2006. The workshop was the third workshop organised by ERCIM to promote co-operation with Grid actors from South-East Asian countries in the European Union's 6th and 7th Framework Programmes (FP). This workshop was held in conjunction with the winter workshop of the Grid Forum Korea (GFK). The workshop was organised around four thematic areas: Grid infrastructure, Grid Middleware, Grid applications, and Business Grid.

The final project report published on the project web site provides a substantial overview on current Grid activities in Europe, China and South Korea.



EchoGRID - European and Chinese cooperation on Grid

A Specific Support Action funded by the European Union

EC funding: €1,545,000

ERCIM's role:

administrative coordinator

ERCIM members involved:

CNR, FhG, INRIA, STFC

Duration:

January 2007 - December 2008

<http://echogrid.ercim.org/>

Grid@Asia

Grid@Asia, Advanced Grid Research Workshops through European and Asian Co-operation

A Specific Support Actions funded by the Information Society Technologies programme of the European Union

EC funding: €39,600

ERCIM's role:

administrative coordinator

Duration:

April 2005 - January 2007

<http://www.gridatasia.net/>

DELOS

DELOS is a Network of Excellence (NoE) on Digital Libraries. The main objectives of DELOS are research, whose results are in the public domain, and technology transfer, through cooperation agreements with interested parties.

Digital Libraries represent a new infrastructure and environment that has been made possible by the integration and use of a number of IC technologies, the availability of digital content on a global scale and by a strong demand from users who are now on-line. They are destined to become an essential part of the information infrastructure in the 21st century. The DELOS vision for digital libraries is that they should enable any citizen to access all human knowledge any time and anywhere, in a friendly, multi-modal, efficient and effective way, by overcoming barriers of distance, language, and culture and by using multiple Internet-connected devices.

Digital Libraries are starting to support the specialized needs of very diverse technologies and applications, from cultural heritage to general science, health, government, and education. After approximately ten years of development, they have moved far beyond any connotations of the term "Library", to also encompass Digital Archives and Museums and now have functionality to deal with multimedia objects often with embedded general knowledge, semantics, and behaviour. To fulfil their new roles as universal knowledge infrastructures, Digital Libraries require research in several new key areas pointing to the development of:

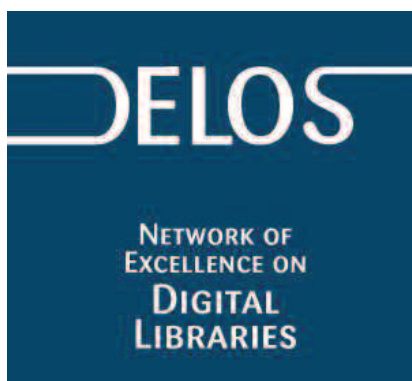
- user-centered system design methodology
- pro-active systems with functionality that facilitates collaboration, communication, and information creation
- generic Digital Library Management Systems that provide basic system infrastructures that can be used to implement application specific digital libraries incorporating context-specific services.

The DELOS Network of Excellence in Digital Libraries intends to advance the field in these new and exciting directions, with the aim of progressing to the development of the next-generation Digital Library system. To this end, DELOS coordinates a joint programme of activities of the major European teams working in digital library related areas. The objective is to develop dynamic universal knowledge environments, which will transform research and education at all levels by collecting, organizing and making publicly accessible on-line vast quantities of information. The ultimate goal is to provide access to human knowledge from anywhere and any time and in an efficient and user-friendly fashion. DELOS also aims at disseminating knowledge of digital library technologies to many diverse application domains, by providing access to technological know-how, services, test-beds, and the necessary expertise to facilitate their take-up. In this context, one of the major efforts started last year is the cooperation with the Office of The European Library, aimed at transferring digital library functionality developed by DELOS members to the TEL system.

The research activities of DELOS have been organized in seven clusters:

- Digital Library Architecture
- Information Access and Personalization
- Audio/Visual and Non-traditional Objects
- User Interfaces and Visualization
- Knowledge Extraction and Semantic Interoperability
- Preservation
- Evaluation

DELOS has been working on the development of a Digital Library Reference Model that is designed to meet the needs of the next-generation systems, and on a globally integrated prototype implementation of a Digital Library Management System, called DelosDLMS, which will serve as a concrete partial implementation of the reference model and will encompass many software components developed by DELOS partners. They are two major steps in the direction of the DELOS vision.



A Network of Excellence on Digital Libraries,

supported by the Information Society Technologies programme of the European Union

EC funding: €6,000,000

ERCIM's role:
administrative coordinator

ERCIM members involved:
ISTI-CNR, CWI, ETH Zurich (SARIT), Fraunhofer-Gesellschaft, FORTH, INRIA, NTNU, SICS, Masaryk University Brno (CRCIM), Università della Svizzera Italiana (SARIT), SZTAKI

Scientific coordination:
Costantino Thanos (ISTI-CNR)

Duration:
January 2004 - December 2007

<http://www.delos.info/>

Working Groups

The purpose of an ERCIM working group is to build and maintain a network of ERCIM researchers in a particular scientific field. The working groups are open to any researcher in the specific scientific field.

The activities of a Working Group can be divided into several areas: workshops to build the community and maintain its vibrancy, projects to move forward the R&D in the particular area of the working group, and human mobility (internal mobility and fellows) to assure the appropriate trained human capital. A working group receives support in the form of initial seed money, on application to the ERCIM Executive Committee, to set up a first workshop.

Travel support is given to ERCIM researchers by their institutes to participate in the workshops organised by the working group. It is expected that each working group organises at least one annual workshop. A major activity of an ERCIM working group is to search actively for project funding that crosses national borders. ERCIM institutes have reserved resources to stimulate mobility, enabling work on collaborative research projects at other institutes for periods from one to six months. Working Groups are also invited to identify topics of interest to be included in the half-year calls published for the ERCIM 'Alain Bensoussan' Fellowship Programme, and as a consequence can participate in this programme by hosting a fellow. ERCIM working groups contribute many of the articles in ERCIM News and commonly provide scientific coordination for the special theme sections. They also participate actively in producing ERCIM strategic reports.

In 2006, the ERCIM Working Group 'User Interfaces for All' has been closed after twelve years of successful operation. The research community founded by this Working Group will continue its collaborative efforts in the context of SESAMI, a new Working Group on "Smart Environments and Systems for Ambient Intelligence". Also established in 2006 was the Working Group 'Digital Patient' whose members contribute to the European effort on the Virtual Physiological Human.

<http://www.ercim.org/activity/workgroup.html>

Working Group Activities in 2006

Applications of Numerical Mathematics in Science

Coordinator:

Mario Arioli, STFC

WG Web page:

<http://www.numerical.rl.ac.uk/ercim/WG1index.html>

Computing and Statistics

The Working Group Computing and Statistics is an evolution of the previous Working Group 'Matrix Computations and Statistics' which has been established in 2001. The aims and scope of the new group are broader; it comprises a number of specialized tracks within the interface of computing

Joint Project:

COMISEF - Computational Optimization Methods in Statistics, Econometrics, and Finance. COMISEF provides several tutorials and workshops for training and transfer of knowledge. The project was approved before the establishment of the new Working Group, however, all partners are active members of the specialized WG track "Optimization Heuristics in Estimation and Modelling".

Joint Publication:

2nd Special issue on Numerical Algorithms, Parallelism and Applications, Erricos John Kontoghiorghes and Bernard Philippe; (<http://www.sciencedirect.com/science/journal/01689274>)

Coordinator:

Erricos Kontoghiorghes, School of Computer Science and

Information Systems, Birkbeck, University of London

WG web page:

<http://www.dcs.bbk.ac.uk/ercim/>

Constraints

Joint Project:

Net-WMS - Towards integrating Virtual Reality and optimisation techniques (see description on page 15)

Joint Publication:

Recent advances in Constraints, B. Hnich, M. Carlsson, F. Fages, F. Rossi, Springer Verlag LNAI 3978 (<http://www.springer.com/dal/home/generic/search/results?SGWID=1-40109-22-168961137-0>)

Organised Event:

International Workshop on Constraint Solving and Constraint Logic Programming, Caparica, Portugal, 26-28 June 2006

ERCIM fellows hosted:

Andras Kovacs at 4C Cork University, Ireland and INRIA

Cooperations:

The Working Group is cooperating with Peugeot PSA France, Fiat Italy and KLS Optim in the framework of the Net-WMS project.

Coordinator:

François Fages, INRIA

WG web page:

<http://contraintes.inria.fr/~soliman/ercim/>

ERCIM Working Group 'User Interfaces for All': Mission Accomplished

After twelve years of successful operation, the ERCIM Working Group 'User Interfaces for All' is drawing to a close. This Working Group has contributed significantly to the creation of a scientific community dedicated to Universal Access and Design for All in Europe, as well as to the establishment of this new research field.

Since its establishment in 1995, the ERCIM Working Group 'User Interfaces for All' (<http://www.ui4all.gr/>) has systematically promoted the Design for All principles in Human-Computer Interaction (HCI). The concept of 'User Interfaces for All' involves developing user interfaces for interactive applications and e-services that will provide universal access to interactive applications and services. The activities of the Working Group have included the organization of a series of very successful workshops, which have helped consolidate recent work and stimulate discussion in the field. These workshops have brought together researchers from ERCIM institutions and other organizations worldwide, who share the common aspiration of making the information society equally accessible to all citizens.

The work of the ERCIM WG UI4ALL led in 2001 to the establishment of the International Conference on Universal Access in Human-Computer Interaction (UAHCI), which is part of the HCI International Conference series (<http://www.hci-international.org/>). UAHCI has established an international forum attracting participants from a broad range of disciplines and fields of expertise. Its purpose is to support the dissemination and exchange of results of theoretical, methodological and empirical research that addresses issues related to the attainment of universal access in the development of interactive software.

The Working Group has also contributed to the establishment of the international, interdisciplinary refereed journal 'Universal Access in the Information Society' (UAIS; <http://www.springeronline.com/journal/10209/about>), published by Springer. UAIS provides an archival publication channel for the discussion and advancement of theoretical and practical aspects of universal access in the information society, and stimulates cross-fertilization between the various contributing disciplines.

Many members of the ERCIM WG UI4ALL have also contributed to the edited book 'User Interfaces for All – concepts, methods and tools'. This is the first book to have been dedicated to issues of universal design and universal access in HCI, and was published by Lawrence Erlbaum Associates in 2001 (<http://www.ics.forth.gr/hci/publications/book.html>,

Working Group Activities in 2006

Dependable Software-Intensive Embedded Systems

Joint Project:

DECOS - Dependable Embedded Components and Systems - aims at facilitating the design, development, validation and certification and the deployment of dependable embedded systems in safety-critical applications. The ERCIM working group is one of the dissemination partners of the DECOS project. Joint workshops are fully funded by DECOS to achieve broad dissemination of the Working Group and DECOS results. The group

ERCIM Decos booth.



was present with an ERCIM booth at six conferences in addition to the two workshops they organised in 2006.

Joint Publications:

- Proceedings of the First Workshop on Dependable Embedded Systems, Schoitsch, E., Skavhaug, A., et. al., ISBN - 2-912335-15-9
- Proceedings ME'06, Embedded Systems Day, Schoitsch, E. et al., ISBN 3-85133-040-4
- ERCIM News 67, October 2006, special theme "Embedded Intelligence"

Organised Events:

- ERCIM/DECOS Workshop at Euromicro 2006, Dubrovnik (Cavtat), Croatia, 29. July 2006
- DECOS/ERCIM-Workshop at SAFECOMP 2006, Gdansk, Poland, 26. September 2006
- Embedded Systems Day, at ME'06, Vienna, 12. October 2006

Coordinators:

- Erwin Schoitsch, Austrian Research Centers / AARIT
- Amund Skavhaug, NTNU

WG web page: <http://its.arcs.ac.at/ercim/>

Digital Patient

Coordinator:

Ioannis Tollis, ICS-FORTH

WG web page:

http://www.ercim.org/wg/Digital_Patient/

ISBN 0-8058-2967-9). It is a collection of thirty chapters written by leading international authorities who are affiliated with academic, research and industrial organizations and non-market institutions. It provides a comprehensive overview of the state of the art in the field, and includes contributions from a variety of theoretical and applied disciplines and research themes.

Furthermore, the work of the ERCIM WG UI4ALL has contributed to the establishment of the International Scientific Forum 'Towards an Information Society for All' (ISF-IS4ALL; 1997-2000), an international ad hoc group of experts who were the first to recognize the need for a global approach to an information society that is accessible, usable and acceptable by all citizens (http://www.ui4all.gr/isf_is4all/). Two White Papers have been published in the International Journal of Human-Computer Interaction and were also submitted to the European Commission, reporting on an evolving international R&D agenda in the field of HCI. Since then, the vision of an Information Society for All and the necessity for universal access to information society technology have acquired widespread acceptance and importance. This is the case not only at a scientific and technological level, but also at a European policy level, as demonstrated by the eEurope 'Information Society for All' initiative of the European Commission. The activities initiated by the ISF-IS4ALL continue in the framework of the Thematic Network (Working Group) 'Information Society for All' (IST-1999-14101 - IS4ALL, http://www.ui4all.gr/isf_is4all/),

which has consolidated knowledge on universal access in the context of information society technology into a comprehensive validated code of design practice. This led to the publication in 2005 by Springer of the edited book 'Universal Access in Health Telematics - A Design Code of Practice' (<http://www.springeronline.com/3-540-26167-2>, ISBN: 3-540-26167-2). An online training course in Design for All (<http://is4all-tc.ics.forth.gr>) has also been developed.

As of the end of 2006, following the successful 9th Workshop, the time has come to consider the mission of this Working Group fully accomplished. At the same time, the emergence of ambient intelligence is raising new and fascinating research challenges, which are rapidly gaining attention from an increasing number of researchers and practitioners in Europe and worldwide. The notions of universal access and User Interfaces for All are central to this vision, since ambient intelligence aims at providing implicit, unobtrusive interaction by putting people, their social situations, and the corresponding environments at the centre of design considerations. These issues will be addressed by the new ERCIM Working Group 'Smart Environments and Systems for AMbient Intelligence' (SESAMI, <http://www.ics.forth.gr/sesami/>), which was established in 2006 (see article in this issue). The research community founded by the ERCIM Working Group UI4ALL will therefore continue its collaborative efforts in the context of SESAMI.

<http://www.ui4all.gr/>

Environmental Modelling

Joint Publications:

- Advanced technology for environmental modelling (Editorial), Thomas Lux and W. Andrew Matthews, Reference information: Environmental Modelling & Software, Volume 22, Issue 3, 279-280 (<http://dx.doi.org/10.1016/j.envsoft.2005.07.027>)
- Next Generation GRIDs for environmental science, Keith G. Jeffery, Reference information: Environmental Modelling & Software, Volume 22, Issue 3, 281-287 (<http://dx.doi.org/10.1016/j.envsoft.2005.07.028>)
- An operational real-time air quality modelling system for industrial plants, R. San José, J.L. Pérez and R.M. González, Reference information: Environmental Modelling & Software, Volume 22, Issue 3, 297-307 (<http://dx.doi.org/10.1016/j.envsoft.2005.07.030>)
- Benchmarking two simulation models for underwater and atmospheric sound propagation, N.A. Kampanis, D.A. Mitsoudis and M.C. Dracopoulos, Reference information: Environmental Modelling & Software, Volume 22, Issue 3, 308-31 (<http://dx.doi.org/10.1016/j.envsoft.2005.07.033>)
- Experience with data mining for the anaerobic wastewater treatment process, M. Dixon, J.R. Gallop, S.C. Lambert and J.V. Healy, Reference information: Environmental Modelling & Software, Volume 22, Issue 3, 315-322 (<http://dx.doi.org/10.1016/j.envsoft.2005.07.031>)

- A multifractal approach for extracting relevant textural areas in satellite meteorological images, Jacopo Grazzini, Antonio Turiel, Hussein Yahia and Isabelle Herlin, Reference information: Environmental Modelling & Software, Volume 22, Issue 3, 323-334 (<http://dx.doi.org/10.1016/j.envsoft.2005.07.032>)

Organised Event:

13th ERCIM Environmental Modelling Group Workshop, Berlin 31 August - 1 September 2006

Coordinator:

Achim Sydow, Fraunhofer FIRST

WG Web page:

<http://ercim.first.fraunhofer.de/>

Formal Methods for Industrial Critical Systems

Joint Publications:

- The industrialization of formal methods, Fitzgerald J.S., Gnesi S., Mandrioli D., Journal on Software Tools for Technology Transfer (STTT), vol. 8 (4-5), pp. 301-
- 11th International Workshop on Formal Methods for Industrial Critical Systems, Lubos Brim, Martin Leucker
- The FMICS View on the Verified Software Repository, Alvaro Arenas, Juan Bicarregui, Tiziana Margaria
- Formal Methods: Applications and Technology, Proceedings of FMICS PDMC 2006, Brim, L.; Haverkort, B.; Leucker, M.; Pol, J.v.d. (Eds.), LNCS Vol. 4346, ISBN: 978-3-540-70951-0

New ERCIM Working Group 'Smart Environments and Systems for Ambient Intelligence'

The Working Group SESAMI, formed in 2006, focuses on research towards distributing, embedding, coordinating and interactively delivering computing intelligence, while putting people and social contexts at the centre of design considerations. This will result in smart surrounding environments and ubiquitous intelligence.

Ambient intelligence represents a vision of the near future in which 'intelligent' or 'smart' environments and systems react in an attentive, adaptive, and active (sometimes even proactive) way to the presence and activities of humans and objects in order to provide intelligent/smart services to the inhabitants of these environments.

Ambient intelligence technology integrates sensing capabilities, processing power, reasoning mechanisms, networking facilities, applications and services, digital content, and actuating capabilities distributed in the surrounding environment. While a wide variety of technology is involved, the goal of

ambient intelligence is to hide its presence from users by providing implicit, unobtrusive interaction paradigms. People and their social situations, ranging from individuals to groups, be they work groups, families or friends and their corresponding environments (office buildings, homes, public spaces etc), are at the centre of the design.

The scope of the ERCIM Working Group SESAMI includes the facilitation of collaborations in this area, on the grounds of on-going, potentially cross-domain, basic and applied research and development. In this context, SESAMI will pursue novel insights on designing, implementing, managing and maintaining smart computational environments on any scale. This will enable to enhance and go beyond traditional computational support of human activities for any given situation, context or role.

Background

Ambient intelligence and smart environments represent an emerging field of research and development that is rapidly gaining attention from an increasing number of researchers and practitioners worldwide. There are several reasons for this.

Ambient intelligence brings a special perspective to research associated with technical fields such as ubiquitous computing, pervasive and proactive computing, ambient computing, embedded computing and smart objects. In addition, the

Working Group Activities in 2006

Organised Events:

- 11th International Workshop on Formal Methods for Industrial Critical Systems, Bonn, Germany, 26-27 August 2006
- FMICS Session during ISOLA 2006, Paphos, Cyprus, 18 November 2006

Cooperations:

The Software Engineering Group of the University of Malaga participated in two collaboration projects with the company Cetecom (renamed to AT4Wireless). The main topic of the projects was the use of ITU-T languages and validation tools to develop the stacks of signalling protocols in the access network in cellular systems.

WG Coordinator:

Pedro Merino, University of Malaga/ SpaRCIM

WG Web page:

<http://www.inrialpes.fr/vasy/fmics/index.html>

IT and Mathematics applied to Interventional Medicine

Joint Publication:

Study of pulsatile blood and injected medicine fluid flow in TACE therapy, Tsai SF, Rani HP, Sheu TWH, Thiriet M, Submitted to CMBBE

Organised Event:

Workshop on Multiphysics simulation in Biomedical Applications, Mosbach, Germany, 21 November 2006

WG Coordinator: Marc Thiriet, INRIA

WG Web page:

<http://www-rocq.inria.fr/who/Marc.Thiriet/Im2im/>

Image and Video Understanding

Joint Project:

MUSCLE (see description on page 12)

WG Coordinator: Eric Pauwels, CWI

WG Web page:

http://www.cwi.nl/ERCIM/WG/Image_Understanding/wg_iu_portal.html

Rapid Integration of Software Engineering Techniques

Joint Publications:

- RISE '2005 - Rapid Integration of Software Engineering Techniques, proceedings of the 2d International Workshop, Heraklion, Crete, September 8-9, 2005, N. Guelfi, A. Savidis, Lecture Notes in Computer Science, vol. 3943, Springer-Verlag, 2006
- CAA-DRIP: a framework for implementing Coordinated Atomic Actions, A. Capozucca, N. Guelfi, P. Pelliccione, A. Romanovsky, A. Zorzo, The 17th International Symposium on Software Reliability, Raleigh, North Carolina

Organised Event:

RISE 2006 International Workshop on Rapid Integration of Software Engineering Techniques, Geneva, Switzerland, 13-15 September 2006

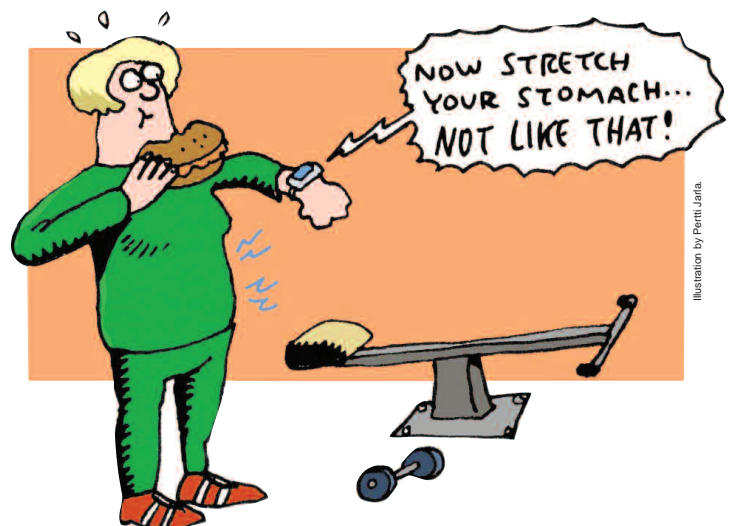
notion of ambient intelligence is becoming a de facto key dimension of the emerging Information Society, since many next-generation industrial digital products and services are shifting towards a smart computing environment.

Focus of Thematic Areas

Work related to ambient intelligence is concerned with modelling and supporting people and their activities, sensing and locating people and objects, managing and interpreting contexts, providing awareness and notification, and enabling people to interact naturally and intuitively with their environments via multiple modalities and coupled devices. Additionally, a key issue regarding smart environments is the delivery of extensible infrastructures with varying intelligent computational resources exploiting underlying information sources, corresponding software platforms and architectures able to provide and handle intelligent services. The orchestration and integration of computational elements that comprise distributed applications serving multiple users, both mobile and stationary, is another important aspect of ambient intelligence. Relevant applications are expected to provide value-added services via smart artefacts that are smoothly integrated with the surrounding environment and can also be accessed remotely in distributed environments. Potential thematic topics of the SESAMI Working Group include, but are not limited to, the following:

- modelling and support of human activity
- context models, management and interpretation

- sensing paradigms and technology
- awareness and notification
- tangible, multimodal and implicit interaction
- universal access
- mobile and stationary artefacts
- distribution and orchestration
- service infrastructures



The goal of ambient intelligence is to hide its presence from users by providing implicit, unobtrusive interaction paradigms.

Coodinator:

Nicolas Guelfi, University of Luxembourg

WG Web page: <http://rise.uni.lu/tiki/tiki-index.php>

Security and Trust Management

Organised Events:

- Security and trust management workshop at STM06, Hamburg, Germany, 20-21 September 2006
- 6th International School on Foundations of Security Analysis and Design, Bertinoro, Italy, 10-16 September 2006

Coodinator:

Fabio Martinelli, CNR

WG Web page:

<http://www.iit.cnr.it/STM-WG/>

Soft Computing

Organised Event:

5th ERCIM workshop on Soft Computing, Malaga, Spain, 13-15 September 2006

Coodinator:

Petr Hajek, Institute of Computer Science, Academy of Sciences of the Czech Republic/CRCIM

WG Web page: <http://www.cs.cas.cz/ercim/>

Software Evolution

Joint Projects:

- European Research Training Network "SeGraVis: Syntactic and Semantic Integration of Visual Modelling Techniques" (<http://www.segravis.org>)
- Marie-Curie Training Action "Leg2Net: From Legacy Systems to Services in the Net"
- SERIOUS: Software Evolution, Refactoring, Improvement of Operational and Usable Systems (<http://www.hitech-projects.com/euprojects/serious/index.htm>)
- COSE: Controlling Software Evolution, a project supported by the Swiss National Science Foundation (<http://www.inf.unisi.ch/projects/cose/>)
- Research Center on Structural Software Improvement, funded by FNRS, Belgium (<http://www.restructuring.be>)

Joint Publications:

- Proceedings of the 3rd workshop on software evolution through transformations, Jean-Marie Favre, Reiko Heckel and Tom Mens, Electronic Communications of the EASST, Volume 3, 2006 (<http://eestas.cs.tu-berlin.de/index.php/eestas/issue/view/3>)
- Essentials of the 4th UML/MODELS workshop in software model engineering (WISME 2005), Krzysztof Czarnecki, Jean-Marie Favre, Martin Gogolla, Tom Mens, LNCS 3844: 151-158, Springer, 2006
- Challenges in software evolution, Tom Mens, Michel Wer-

- multimedia and adaptation
- coordination and collaboration
- social aspects, reflecting the 'human in the loop'
- security and privacy
- applications, eg office/work, home, public spaces, health care, education and leisure/entertainment.

Current Activities

Two special thematic sessions are to be held as part of the 4th International Conference for Universal Access in Human Computer Interaction (UAHCI), jointly with the 12th International Conference on Human-Computer Interaction, on 22–27 July 2007 in Beijing, China (<http://www.hcii2007.org/>). These are SESAMI–I: Interaction Design and Evaluation, chaired by Norbert Streitz, and SESAMI–II: Tools, Architectures and Infrastructures, chaired by Anthony Savidis. An open call for papers has been made for both sessions, resulting in a total of fourteen accepted papers, with seven per session. All papers will be published as part of the Springer LNCS proceedings of the UAHCI 2007 conference.

A special theme issue will be published by Elsevier in their international, refereed, interdisciplinary journal 'Interacting with Computers' (IwC). The issue is entitled 'Interaction in Ambient Intelligence: Methods, Tools and Applications' and is guest-edited by Anthony Savidis, Norbert Streitz, Carsten Magerkurth and Constantine Stephanidis. The selection process for the papers has been initiated by the guest editors.

<http://www.ics.forth.gr/sesami/>

'Digital Patient' - A New ERCIM Working Group for Pathophysiology Modelling

In order to contribute to the European effort on the Virtual Physiological Human a new ERCIM Working Group (WG) on the Digital Patient was created.

The Working Group named "Digital Patient" facilitates multi-disciplinary research in this domain, with a special emphasis on:

- computational frameworks for modelling and simulation of pathophysiological human function at multiple levels (from molecular/genetic to tissue/organ)
- multiparameter and multilevel data and information visualization, as well as tools and novel interaction paradigms relevant for this domain (eg for mixed reality such as tumour growth simulation in real 3D patient data), and user interfaces for specific medical applications (eg educational GUIs for training in 3D simulations)
- the image analysis and data assimilation issues related to coupling/fusion of anatomical models with imaging data of tissue properties (eg X-rays, US, CT, MRI, PET, SPECT, optical imaging etc).

The ERCIM WG on the Digital Patient intends to promote interaction between the relevant ERCIM R&D groups, and to facilitate cross-fertilization and synergistic activities in collab-

Working Group Activities in 2006

- melinger, Stéphane Ducasse, Serge Demeyer, Robert Hirschfeld, Mehdi Jazayeri, Proc. International Workshop on Principles of Software Evolution (IWPSE 2005) (ftp://ftp.umh.ac.be/pub/ftp_infos/2005/Mens2005IWPE-Challenges.pdf)
- Software Evolution and Feedback: Theory and Practice, N. H. Madhavji, J. Fernandez-Ramil, D. Perry, Wiley 2006. ISBN 0-470-871806
 - Detecting and resolving model inconsistencies using transformation dependency analysis, Tom Mens, Ragnhild Van Der Straeten, and Maja D'Hondt, Proceedings MODELS 2006, LNCS 4199, pp. 200-214, Springer, 2006
 - An Experimental Investigation of UML Modeling Conventions, C.F.J. Lange, Bart Du Bois, M.R.V. Chaudron, Serge Demeyer, Proceedings ACM/IEEE Int. Conf. MODELS 2006
 - A Quantitative Investigation of UML Modeling Conventions, Bart Du Bois, C.F.J. Lange, Serge Demeyer, M.R.V. Chaudron, Proc. Workshop on Quality in Modeling. Selected as best workshop paper in Proc.
 - A Model of Maintainability - Suggestion for Future Research, Mira Kajko-Mattsson and Gerardo Canfora and Dan Chiorean and Arie van Deursen and Tuomas Ihme and Meir M. Lehman and Rupert Reiger and Torsten Engel and Josef Wernke, In Hamid R. Arabnia and Hassan Reza (Eds.). Software Engineering Research and Practice 2006

- Introduction to the Special on Software Architecture Reconstruction and Modeling, Rick Kazman and Arie van Deursen and Rainer Koschke, Automated Software Engineering 13(2):199-200

Organised Events:

- ERCIM Workshop on Software Evolution 2006, Lille, France, 6-7 April 2006
- 3rd International Workshop on Software Evolution through Transformations (SETra 2006), Natal, Rio Grande do Norte, Brazil, 22 September 2006
- 5th Belgian-Netherlands Software Evolution Workshop (BENE-VOL 2006), Delft, The Netherlands, 11-12 December 2006
- GRASCOMP Doctoral Course on Advanced Topics in Software Evolution, UMH and UCL, Belgium
- FIRST.dk Workshop on Software Evolution, Copenhagen, Denmark, 14 December 2006.

Coodinator:

Tom Mens, Université de Mons-Hainaut

WG Web page:

<http://w3.umh.ac.be/evol/>

oration with other groups and initiatives such as the Europhysiome initiative currently funded by the European Commission.

To date, many ERCIM (and non-ERCIM) members have joined this effort. The last WG meeting was held in Nice in October 2006, and identified three interesting research directions:

1) Cardiovascular Modelling

Cardiovascular modelling is important for the therapy planning and guidance of cardiovascular therapies. An example is Atrial and Ventricular Radio-Frequency ablation for the surgical treatment of atrial/ventricular flutters or fibrillations. The therapy consists of burning cardiac cells that are causing pathological electrical pathways. Prior to burning the cardiac tissue, the cardiologist must precisely locate the pathological cardiac cells by reading electrical signals measured by more than ten electrodes inserted through an endovascular procedure. The real-time interpretation of those signals requires significant training, and the planning and execution of the therapy could be made more efficient with the use of electrophysiological models.

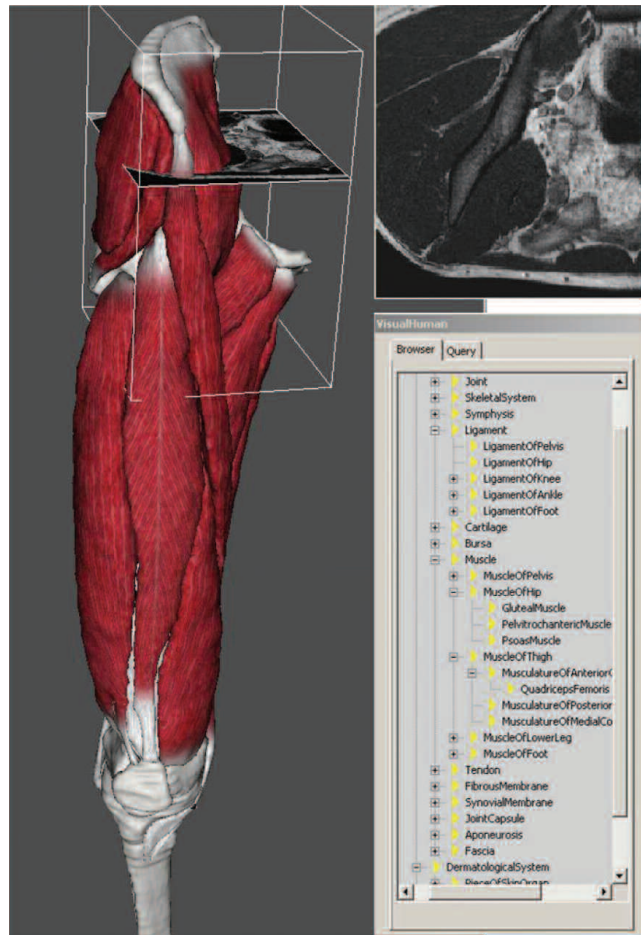
Another important example is Cardiac Resynchronization Therapy. Resynchronization therapy artificially stimulates the myocardium through implanted electrodes in order to limit the ventricular dysfunction caused by asynchronous ventricular contraction. Although a number of cardiac resynchronization therapeutic strategies exist (regarding the selection of the number, location and delay between those electrodes), nearly 30% show no real improvement in cardiac function. It is therefore plausible that a thorough planning of CRT based on a personalized cardiac model could greatly assist the cardiologist in deciding the optimal strategy.

2) Musculoskeletal Modelling

Musculoskeletal modelling aims to predict musculoskeletal behaviour (eg bone kinematics, tissue deformation, tissue degeneration and tissue reconstruction) from the morphology, kinematical constraints, mechanical constraints or neuromuscular impulses. In addition to applications in orthopaedics (eg early detection of osteoarthritis, prosthesis design, osteotomy planning, tendon lengthening and ligament reconstruction), this would be of use in kinesiology for movement optimization (eg reduction of tennis elbow), rehabilitation and ergonomics (eg minimization of physical fatigue under specific constraints). From the physiological point of view, a link between large-scale studies (anatomy-based virtual humans animated from motion capture and EMG) and small-scale studies (deformation analysis due to local fibre actuation) has not yet been achieved. Bridging those domains through computationally efficient and scalable mechanical simulation methods is a major challenge.

3) Oncology Modelling

Oncology modelling focuses on the simulation of tumour growth and/or the response of tumours and physiological tissues to different therapeutic regimes (eg chemotherapy, radiotherapy or combined therapy). In this way, the optimal therapy decision for individual patients can be selected on the basis of the best 'simulated therapy' outcome. For this to be successful,



Ontology-based framework for musculoskeletal modelling, simulation and visualization (by courtesy of MIRALAB, University of Geneva).

it is crucial to test these models against reality and thus assess their usefulness in clinical practice. From a purely technical perspective, the challenges include: the development/refinement of a number of hybrid discrete Monte Carlo/cellular automata and continuous differential equation simulation models of normal tumour growth and response to therapeutic modalities; image analysis tools such as geometrical normalization (eg 3D MRI before and after therapy); extraction of relevant information (eg accurate tumour delineation also considering liquefaction during therapy); normalization and quantification from images (eg differential gene expression, tissue density); and visualization. The main clinical applications are glioma and nephroblastoma (Wilm's tumour). These applications have been selected on the basis of existing work, experience and ongoing clinical collaborations in relevant projects. The ultimate goal is to optimize the therapeutic strategy by conducting, in a patient-specific setting, in silico experiments on tumour growth and tumour and normal tissue response to therapeutic schemes.

http://www.ercim.org/wg/Digital_Patient/

ERCIM "Alain Bensoussan" Fellowship Programme

The PhD Fellowship Programme has been established as one of the premier activities of ERCIM. Since its inception in 1991, some 200 fellows have passed through the programme. Nine young scientists commenced an ERCIM PhD Fellowship in 2006 and 33 fellows have been employed during the year, representing 258 person-months.

ERCIM fellows hosted in 2006

- Osman Abul at NTNU and CNR
- Anwar Al Hamra at NTNU
- Suzana Andova at NTNU
- Alessandro Artusi at SZTAKI
- Monica Benito at INRIA
- Prasanna Chaporkar at INRIA and NTNU
- Maja D'Hondt at INRIA
- Stefan Dziembowski at CNR
- Giorgos Flouris at CNR
- Christian Gagné at INRIA and SARIT
- Benoît Gaudin at FhG
- Dailo Glogoroski at NTNU
- Javier Herranz at INRIA and CWI
- Christophe Jelger at SARIT and FhG
- Hanna Kozankiewicz at INRIA and CWI
- Andreas Kovacs at IUC and INRIA
- Monika Lanzenberger at NTNU and FNR
- Vsevolod Laptev at FNR and NTNU
- Manuel Lopes at VTT
- Henrik Lundqvist at NTNU
- Jani Mäntyjärvi at CNR
- Rode McCall at FNR and FhG
- Peter Nillius at FORTH
- Balakrishna Prabhu at VTT and CWI
- Sasa Radomirovic at NTNU
- Giuseppe Scarpa at ERCIM and INRIA
- Ludwig Seitz at SICS
- Gupta Shalini at INRIA
- Qyian Shi at NTNU
- Raphael Troncy at CNR and CWI
- Ellen Van Paesschen at INRIA and CWI
- Martins Rico Varela at SICS and VTT
- Petko Ivanov Yanev at CNR and INRIA

The ERCIM Fellowship Programme is open to young researchers from all over the world. It focuses mainly on topics of interest identified by the ERCIM Working Groups and the research projects managed by ERCIM. Ideally, a fellow will work in two ERCIM institutes, thus contributing not only to the work done locally, but also to cohesion between ERCIM partners and to the cross-fertilisation and cooperation between research groups working in similar areas in different laboratories.

The fellowship scheme also helps young scientists to become involved in one of the ERCIM Working Group initiatives, to improve their knowledge of European research structures and networks and to gain more insight into the working conditions of leading European research institutions.

Fellowship Programme figures

	2005	2006	
Fellows employed during the year	.41	33	↓
Person-months equivalent:	.210	258	↑
Fellows starting a fellowship in the year:	.25	9	↓
Applications received:	.319	195	↓
Female candidates	.19%	20,5%	↑
Applications from non-EU citizens:	.40%	59%	↑

In 2006, nine young scientists commenced an ERCIM PhD Fellowship and 33 fellows have been employed during the year, representing 258 person-months (210 person-months in 2005). About 40 percent of the fellowships have been granted to researchers from countries outside the European Union. This reflects ERCIM's contribution to make Europe not only the world's biggest 'brain factory' but also a large 'brain magnet' in the field of informatics and applied mathematics.

Fellowships are generally of eighteen months duration, spent in two member institutes. In particular cases a fellowship might be of 12 months spent in one institute. Fellows receive a monthly allowance which may vary depending on the country. In order to encourage mobility, a member institution is not eligible to host a candidate of the same nationality.

Candidates must:

- have obtained a PhD degree during the last 4 years (prior to the application deadline) or be in the last year of the thesis work with an outstanding academic record
- be fluent in English
- be discharged or get deferment from military service
- have completed their PhD before starting the grant.

Deadlines for applications are currently 30 April and 30 September each year.

Since 2005 the Fellowship Programme is named to honour Alain Bensoussan, former president of INRIA and one of the three ERCIM founding fathers together with Cor Baayen, former president of CWI, and Gerhard Seegmueller, former president of GMD (now merged with Fraunhofer Gesellschaft).

<http://www.ercim.org/fellowship/>

Cor Baayen Award 2006 for Oliver Heckmann

Oliver Heckmann from Technical University Darmstadt, Germany, and Google Labs Zürich, Switzerland, has been awarded the 2006 Cor Baayen Award for a most promising young researcher in computer science and applied mathematics by ERCIM.



Oliver Heckmann receives the award from ERCIM President Keith Jeffery.

In a particularly tight competition, ERCIM has awarded Oliver Heckmann for the outstanding originality, high impact and quality of his work in the field of network science. To put it in very simple words, Oliver Heckmann tries to give Internet users better quality of service for equal or lower costs. He strives to remove inefficiencies, optimise networks and achieve technological breakthroughs that improve quality of service and/or costs for users. He also sheds light on the trade-off between these two goals. The practical applicability of his results has put him in good contact with many real providers, helped him in acquiring funding, and also led to the recent publication of his book "The Competitive ISP" which also contains many results from his excellent PhD thesis "A System-oriented Approach to Efficiency and Quality of Service for Internet Service Providers".

Oliver Heckmann studied applied economics and electrical engineering at TU Darmstadt with award for excellence. He did his PhD in computer science at TU Darmstadt with Prof. Ralf Steinmetz as supervisor and Prof. Jon Crowcroft from University Cambridge, UK as second supervisor. His PhD thesis was awarded the prestigious best dissertation award of the German Computer Science Association for 2004. After his PhD, he was working as an assistant professor / research group head at the Multimedia Communications Lab (KOM), leading a team of 7 PhD student. Recently, he joined Google Labs in Zürich, Switzerland, to continue working on improving and innovating the Internet and Internet services.

Finalists 2006

According to the award rules, each institute was allowed to select up to two finalists from its country. 19 finalists for the 2006 Cor Baayen Award have been nominated by the ERCIM institutes: Alexandre Bergel, Ireland; Rickard Cöster, Sweden; Ton Dieker, The Netherlands; Guido Dornhege, Germany; Olivier Dousse, Switzerland; Sameh El-Ansary, Sweden; Serge Fehr, The Netherlands; Alain Frisch, France; Tudor Gîrba, Switzerland; Oliver Heckmann, Germany; András Kovács, Hungary; Ivan Laptev, France; Taneli Mielikainen, Finland; Harald Øverby, Norway; Tom Schrijvers, Belgium; Giuseppe Scarpa, Italy; Alkis Simitsis, Greece; Vassilios Solachidis, Greece; Gem Stapleton, United Kingdom.

<http://www.ercim.org/activity/cor-baayen.html>

Award Rules

The Cor Baayen Award, awarded to a most promising young researcher in computer science and applied mathematics, was created in 1995 to honour the first ERCIM President, and is open to young researchers having completed their PhD thesis in one of the 'ERCIM countries', currently: Austria, Belgium, Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Norway, Poland, Spain, Sweden, Switzerland, The Netherlands and the United Kingdom.

The award consists of a cheque for €5000 together with an award certificate. The selected fellow will be invited to the ERCIM autumn meetings.

Conditions

- Nominees must have carried out their work in one of the 'ERCIM countries'
- Nominees must have been awarded their PhD (or equivalent) not more than two years prior to the nomination deadline (usually 15 April each year).
- A person can only be nominated once for the Cor Baayen Award.

Submitting a Nomination

- Nominations should be made by a staff member of the university or research institute where the nominee is undertaking research. Self nominations are not accepted.
- Nominations must be submitted online using the nomination form.

Selection

- Initial selection will be made by each ERCIM institute (the national contact point) which is allowed to put forward up to two candidates from its country.
- Nominees will be informed if they have been selected as one of the two candidates from their country.
- The selection of the Cor Baayen award winner is the responsibility of the ERCIM Executive Committee, who will consult expert opinion in reaching their decision.

Deadline

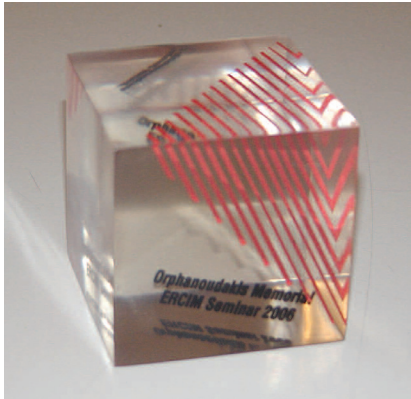
15 April each year.

Stelios Orphanoudakis

ERCIM Memorial Seminar

In honour of Stelios Orphanoudakis, the fourth president of ERCIM, a memorial seminar was held on 30 May 2006 in Budapest during the ERCIM meetings at SZTAKI.

The premature passing of Stelios Orphanoudakis on 18 March 2005 was a great loss for the ERCIM community. A commemorative event was organized by Constantine Stephanidis, director of FORTH-ICS, and was held in Budapest during the ERCIM meetings.



A replica of the memorial artwork for permanent exhibition at ICS-FORTH as a sign of the high esteem in which the ERCIM community holds its former president Stelios Orphanoudakis.

The memorial seminar was opened by Keith Jeffery, president of ERCIM, whose speech highlighted the accomplishments of Stelios Orphanoudakis and the outstanding role he played in ERCIM. The director of ICS-FORTH then gave an overview of the oeuvre of Stelios Orphanoudakis, briefly outlining his distinguished academic career and outstanding scientific achievements, his fundamental role in the life of FORTH and in the past and the future of ICT in Greece, and his influential pioneering activities in international scientific cooperation. Stelios Orphanoudakis deeply believed in ERCIM's promotion of European scientific research, and was actively committed to the achievement of this objective. His absence is a great loss for FORTH, for Greece, and for the international scientific community. As a former colleague, Constantine Stephanidis also warmly recalled their collaboration and friendship.

Technical presentations by distinguished speakers and former collaborators of Stelios Orphanoudakis followed, reflecting his main fields of research. Stelios Orphanoudakis had dedicated many years of teaching and research to the fields of computational vision and robotics, intelligent image management and retrieval by content, medical informatics, and medical imaging. The first talk was entitled 'Stelios Orphanoudakis, The European and The Greek', and was given by Niels Rossing (Danish Centre for Health Telematics, Denmark). The talk addressed past and future developments in e-Health, with reference to the pioneering ideas of Stelios Orphanoudakis in this area. Special mention was given to HYGEIANet, the Integrated Regional Health Information Network of Crete, which is one of Orphanoudakis' most significant achievements.

The second talk, 'Computer Vision and Intelligent Systems', was presented by Jan-Olof Eklundh (KTH, Sweden), who summarized the trends in computational vision and robotics. Kostas Daniilidis (University of Pennsylvania, USA) gave the third presentation, '3D Visualization, 3D Navigation, 3D Content Creation'. The pioneering work of Stelios Orphanoudakis in all these areas was emphasized. In addition to his research activities, Orphanoudakis had served on various committees and Working Groups of the European Commission, and was active in numerous European R&D programs.

After the break, Ilias Iakovidis (Deputy Head of Unit-ICT for Health, European Commission) gave a talk entitled 'e-Health: Achievements and Future Plans of the European Union'. Iakovidis also highlighted the important role played by Stelios Orphanoudakis in this area and in the European cooperation. All the presentations offered a unique blend of science and personal reflections.

In the second part of the meeting, Cor Baayen, Dennis Tschritzis, Gerard van Oortmerssen and Alain Bensoussan discussed the extraordinary merits of Stelios Orphanoudakis as a scientist and as an individual, expressing their high estimation of his role in promoting ERCIM. At the end of the meeting, a commemorative sculpture was presented to Constantine Stephanidis for permanent exhibition at FORTH-ICS, and small replicas were presented to Ava Orphanoudakis and the invited speakers. The seminar concluded with a heartfelt speech by Ava Orphanoudakis, which was greatly appreciated by the audience.

From left: Keith Jeffery, ERCIM president, Constantine Stephanidis, director of ICS-FORTH, Ava and Eleni Orphanoudakis, wife and daughter of Stelios Orphanoudakis.



Event Sponsorship

ERCIM supported six conferences, one workshop and a summer school in 2006 through its event sponsorship programme.

With its Event Sponsorship Programme, ERCIM is willing to sponsor up to ten conferences, workshops or summer schools per year. ERCIM will select events for sponsorship that are relevant to the ERCIM community and of excellent scientific quality, and which have a potential impact on the audience and media coverage.

In return for the financial support, ERCIM sponsorship must be acknowledged in all official printed publicity material relating to the event. Promotional and informational material received prior to event commencement must be distributed to the conference participants as a part of the participant's conference package. Event organizers must provide free-of-charge attendance, should ERCIM decide to send a representative. They must also provide a booth in a reasonably prominent place, where materials and further information can be present and distributed. Event organizers must include the ERCIM logo with a link to ERCIM web pages on the title (reference) page of the conference for the period starting with successful PR sponsorship negotiation, for the remaining existence of these web pages.

Within the funding request, the conference organizers are welcome to designate an ERCIM contact person for PR arrangements on the spot (typically an ERCIM-related person among the organizers), or to request that the ERCIM Executive Committee designates a representative.



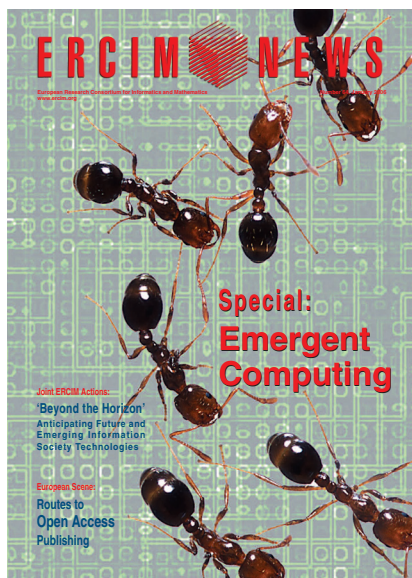
Burkard Monien from University of Paderborn, Germany, talks about "Selfish Routing in Networks" at the ERCIM-sponsored SOFSEM 2006 conference in Merin, Czech Republic.



ERCIM booth at DISC 2006, DISC 2006 - the International Symposium on Distributed Computing.

Events sponsored in 2006

- **SOFSEM 2006 - 32nd Conference on Current Trends in Theory and Practice of Computer Science**, Merin, Czech Republic, 21-27 January 2006
- **World Wide Web Conference 2006**, Edinburgh, UK, 22-26 May 2006
- **CAiSE 2006 - 18th Conference on Advanced Information Systems Engineering**, Luxembourg, June 5-9, 2006
- **ECOOP 2006 - European Conference on Object-Oriented Programming, 20th edition**, Nantes, France, 3-7 July 2006
- **CONCUR 2006 - 17th International Conference on Concurrency Theory**, Bonn, Germany, 27-30 August 2006
- **DISC 2006 - the International Symposium on Distributed Computing**, Stockholm, Sweden, 19-21 September 2006



ERCIM News

Since its creation, *ERCIM News* has evolved from ERCIM's "in-house newsletter" into a periodic multi-disciplinary European magazine in the domains of Information and Computer Sciences, Applied Mathematics and Communication Technologies, published in a printed and online edition.

ERCIM News mainly consist of articles written by scientists and edited according to guidelines designed to make the articles accessible to all target groups. However, invited articles by European policy-makers and decision-makers in relevant areas are also included.

ERCIM News' objective is to provide regular and continually updated high quality and authoritative information concerning European research and development and technology transfer activities in the scientific domains of interest. The information is reported in an expository and easily accessible fashion, with references and links being provided so that the interested reader can find more in-depth information on specific topics as needed. The intended target audience will thus be international and national scientific policy and decision takers, European and national funding agencies, the global scientific community and relevant industrial organisations - with special focus on the European area.

ERCIM News is covering reports and news about scientific projects from all over Europe and even beyond, reflecting ERCIM's growth over the years. Published quarterly, the magazine provides regular high quality information concerning the latest European R&D and technology transfer activities. Through short articles and news items, it provides a forum for the exchange of information between both member institutes and the wider scientific community.

With each issue focusing on a special theme, the ERCIM News series has become a unique collection providing an overview of different topics within information technology. The topics covered by the issues published in 2006 were "Emergent Computing", "Space Exploration", "The European Digital Library" and "Embedded Intelligence". For each issue, ERCIM News invites a personality to write a keynote statement relevant to the European scientific community. Authors have included David Southwood, Director of Science, European Space Agency and Horst Forster, Director Content, Directorate General Information Society and Media, European Commission.

ERCIM News is the result of a close cooperation between all ERCIM institutes. It is published in printed and electronic form. The printed edition has reached a circulation of about 11,000 copies and is distributed in over 100 countries. The on-line edition offers full-text search and the numerous sites and documents quoted can easily be accessed on the Web. ERCIM News has made a significant contribution to the wider recognition of ERCIM.

<http://ercim-news.ercim.org/>

ERCIM News Editorial Board

Central editor:

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- Bernard Hidoine, INRIA, France
- Patrik Hitzelberger, Centre de recherche publique Gabriel Lippmann, Luxembourg
- Annette Kik, CWI, The Netherlands
- Michael Krapp, Fraunhofer SCAI, Germany
- Pia-Maria Linden-Linna, VTT, Finland
- Salvador Lucas, Universidad Politécnica de Valencia / SpaRCIM, Spain
- Benoit Michel, Université catholique de Louvain, Belgium
- Eleni Orphanoudakis, ICS-FORTH, Greece
- Carol Peters, ISTI-CNR, Italy
- Martin Prime, STFC, UK
- Harry Rudin, SARIT, Switzerland
- Erwin Schoitsch, Austrian Research Centers GmbH - ARC, Austria
- Nguyen Hung Son, Warsaw University, Poland
- Ray Walshe, Dublin City University, Ireland

Members

ERCIM has one member institute per country. With PLERCIM joining ERCIM in January 2007 ERCIM has eighteen member organisations.

A member institute must be a leading research establishment in its country with excellent links to both national and international research community. All ERCIM members are national centres of excellence, independent of specific commercial ties, they have a strong involvement in the research programmes of the European Union and joint projects with both small and medium size enterprises and large industrial companies.





Austrian Association for Research in Information Technology



AARIT, the Austrian Association for Research in IT (Österreichische Vereinigung für IT-Forschung), was founded in May 2001 as a platform for the Austrian information technology research community. AARIT is a legal entity and an independent non-profit association. AARIT is ERCIM's gateway to the Austrian information technology research community.



The mission of AARIT is to promote research and development in information technology and related subject areas. To achieve this, AARIT aims to strengthen scientific co-operation among its members on a national level, through international co-operation and through transfer of know-how and knowledge. The activities of AARIT include co-operation with and participation in scientific organisations nationally and internationally. The Association carries out, participates in or commissions research projects, organises meetings and courses, and participates in conferences. Further activities include the granting of fellowships, awards and sponsorships and the collection and exchange of information among members and third parties.

Members

AARIT has both institutional members and individual members. The institutional members of AARIT cover a wide range of research activities. AARIT members participate in research projects such as AGRID (Austrian GRID Consortium), image processing and advanced computer vision, safety and security of software intensive systems, embedded systems, natural language processing, bio-informatics and social aspects of IT. Institutional members include:

Founding members

- Austrian Research Centers, the largest application-oriented research enterprise in the country, with about 1000 employees, where of about four hundred information technologists, work at locations across Austria.
- The Austrian Computer Society (OCG - Oesterreichische Computer Gesellschaft) is Austria's umbrella organisation of associations and institutions involved in information processing.
- Austrian Research Institute for Artificial Intelligence (ÖFAI). At ÖFAI basic and applied research is performed in several areas of Artificial Intelligence
- Salzburg Research - The Salzburg Research Forschungsgesellschaft mbH is a state-owned, non-profit research organisation
- VCPC (European Centre for Parallel Computing in Vienna), established at the at the University of Vienna as part of the Institute for Software Science. Its primary objective is to furthering the use of parallel, distributed, and Grid computing.
- RISC (Research Institute for Symbolic Computation) is an institute of the Johannes Kepler University in Linz. RISC focuses on the interaction and integration of mathematics and computer science.
- Department for Information Systems at the Vienna University of Technology.

Since its foundation, AARIT has acquired further seven members (and lost one founding) from universities and close-to-university institutes at Linz (2), Graz (3) and Vienna (2).



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Austria
Tel: +43 1 512 02 35-0
Fax: +43 1 512 02 35-9
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<http://www.aarit.at/>

Czech Research Consortium for Informatics and Mathematics



CRCIM is a consortium consisting of four major Czech R&D institutes active in informatics and mathematics:



Charles University, Faculty of Mathematics and Physics, Prague



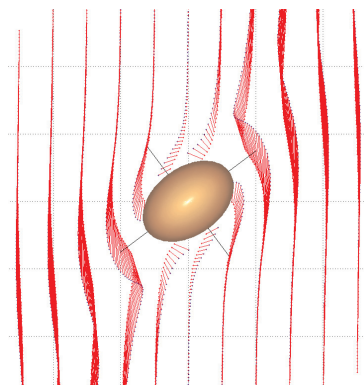
Institute of Information Theory and Automation, Academy of Sciences, Prague



Masaryk University, Faculty of Informatics, Brno



Institute of Computer Science, Academy of Sciences, Prague.



A two-dimensional cut through a rigid ellipsoidal particle rotating in a viscous flow in a regime of simple shear. Arrows indicate the velocity field in a set of chosen markers (point) of the moving fluid.

- Informatics: Control Theory, Econometrics, Pattern Recognition, Image Processing, Statistics and Data Processing;
- Software Engineering and Methodology of Programming, Distributed Systems Design, Computer Networks, Electronic Typesetting, Advanced Man-Machine Interfaces, Data Visualization, Information Systems;
- Theoretical Computer Science: Artificial Neural Networks, Knowledge-based Systems, Nonlinear Modelling, Numerical Nonlinear Analysis and Optimization, Applied Linear Algebra.

Budget

Estimated total annual budget: 12 million

- 70% basic national funding
- 30% participation in (inter)national research programmes and from contracts with industry.

Staff

1120 Researchers / Teachers (estimation).

Mission

The mission of CRCIM is to perform frontier research and teaching in mathematics, informatics and computer science and to transfer acquired new knowledge to society.

Research Topics

- Complexity Theory, Automata, Logic, Combinatorics, Computational Geometry, Parallel and Distributed Algorithms, Neural Networks, Computer Graphics, Formal Linguistic, Databases, Distributed Systems, Operating Systems, Software Engineering;



Contact:
Czech Research Consortium for Informatics and Mathematics
co/ FI MU Botanická 68a
CZ-602 00 Brno
Czech Republic
Tel: +420 2 6884669
Fax: +420 2 6884903
<http://www.utia.cas.cz/>
CRCIM/home.html

CNR – Informatics and Applied Mathematics at the Italian National Research Council



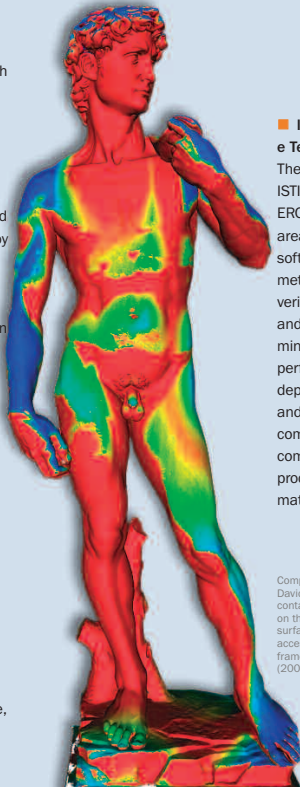
The Italian National Research Council (CNR) is a government funded organization which conducts research in nearly all the main scientific disciplines through a network of research institutes. CNR funding covers the main infrastructures, permanent staff, and some basic research. Individual institutes must find additional funding from national and international contracts.

From 2006, the scientific activities of CNR are structured in eleven macro research areas, each one coordinated by a Department. The Department for Information and Communication Technologies will be responsible for the coordination and evaluation of the scientific and technical activities of the seven CNR Institutes working in this sector.

Information Technology at CNR

ICT activities at CNR are mainly covered by the following institutes:

- IASI – Istituto di Analisi dei Sistemi e di Informatica, Rome
- ICAR – Istituto di Calcolo e Reti ad Alte Prestazioni, Cosenza
- IEIIT – Istituto di Elettronica e di Ingegneria dell'Informazione e delle Telecomunicazioni, Turin
- IIT – Istituto di Informatica e Telematica, Pisa
- IMATI – Istituto di Matematica Applicata e Tecnologie Informatiche, Pavia
- IREA – Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples
- ISTI – Istituto di Scienza e Tecnologie dell'Informazione, Pisa.



Computer simulation of Michelangelo's David. The simulation evaluates the fall of contaminants (eg fall of rain, mist or dust) on the David's surface, which depends on surface slopes, self occlusion and accessibility. Work done by ISTI-CNR in the framework of the David Restoration Project (2002-2003).

Istituto di Scienza e Tecnologie dell'Informazione

The President of CNR has delegated ISTI to represent the IT sector in ERCIM. The strategic research areas currently covered at ISTI are: software engineering, formal methods for specification and verification, information engineering and information systems, data mining, digital libraries, high-performance computing, dependable computing, wireless and mobile networks, human computer interaction, visual computing, image and signal processing, space flight dynamics, materials and structural mechanics.

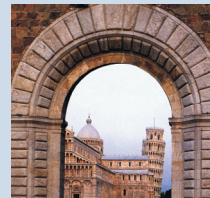
Budget

An estimated €5 million per year, excluding cost of permanent staff:

- 54% EC projects
- 7% Universities
- 9% CNR
- 19% public and local administration
- 11% industry.

Staff

Approximately 150 researchers and technicians plus varying number of graduate students and postdocs.



Contact:
ERCIM Secretariat
ISTI-CNR
Area di Ricerca CNR Via
Moruzzi, 1
56124 Pisa
Italy
Tel: +39 050 315 2878
Fax: +39 050 315 2810
<http://www.isti.cnr.it/>



Centrum voor
Wiskunde en Informatica

Founded in 1946, the Centrum voor Wiskunde en Informatica (CWI) is the national Dutch research institute for mathematics and computer science. CWI conducts pioneering research, generating new knowledge and conveying it to society. It is a co-founder of ERCIM.



Dutch centre for mathematics and computer science

A FUNDAMENTAL DIFFERENCE

Strategy

We will concentrate our research on four socially-relevant themes:

- Earth and Life Sciences
- Management of the Data Explosion
- Societal Logistics
- Software as Service,

to provide a deeper understanding of problems across the health care, climate, communication, congestion, security and service domains.

An International Network

CWI closely cooperates with companies, universities and large technology institutes in the Netherlands and abroad. Together with our partners, we help provide a firm foundation for national and European innovation. CWI is also an incubator for senior academic researchers. World-wide, more than 170 full professors have come from CWI.

CWI Today

CWI concentrates on fundamental questions that are inspired by practical problems.

Some recent applications are: Robust railroad timetables, health care planning agents, querying large distributed databases for forensic research, the Ambulant Open SMIL Player, semi-automatic recognition of individual whales, modelling ship hulls for energy reduction, semantic tools for cultural web databases, software renovation, simulations of living cells, models for lightning, verification of embedded systems, performance analysis of communication networks, 3D tumour recognition, and desktop VR systems.

Budget

Total annual budget: 16.2 million € (2006). Nearly 70 percent of our annual budget is covered by the Netherlands Organisation for Scientific Research (NWO), with the balance coming from national and international research programmes and assignments from industry.

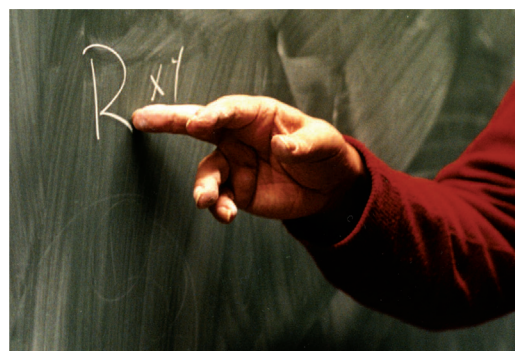
Staff (in full time equivalents)

- 160 Researchers
- 50 Supporting staff.

Contact:

Centrum voor
Wiskunde en Informatica (CWI)
Science Park Amsterdam
Kruislaan 413
NL - 1098 SJ Amsterdam
The Netherlands

Tel: +31 20 592 9333
Fax: +31 20 592 4199
E-mail: info@cwi.nl
www.cwi.nl





Luxembourg's National Research Fund is a public establishment with scientific, financial and administrative autonomy, set up by the Law of 31 May 1999 in order to further stimulate research activities in Luxembourg.

To fulfill this mission, the Fund develops multi-annual research programmes and ensures their implementation by allocation of the financial means put at its disposal.

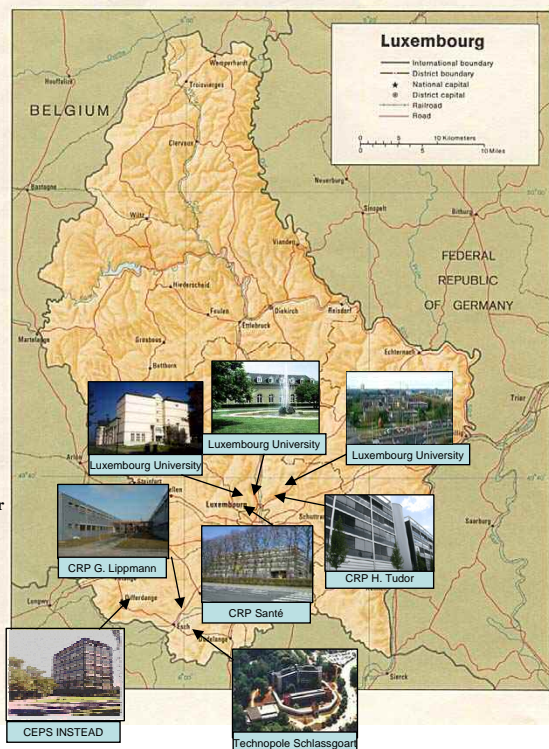
Main participating research institutes in informatics

Centre de recherche public Gabriel Lippmann
<http://www.lippmann.lu>

Centre de recherche public Henri Tudor
<http://www.tudor.lu>

Université du Luxembourg
<http://www.uni.lu>

Centre de recherche public de la Santé
<http://www.crp-sante.lu>



FNR : Fonds National de Recherche Luxembourg

Main research programme in informatics:

Security and efficiency of new practices in e-commerce (SECOM)

Duration: 2001 - 2008
 Total budget: € 7,500,000

To better master the new context of electronic cooperation, the SECOM programme develops an integrated research on the safety of electronic exchange and on the efficiency of new organisational models and software for electronic cooperation.



Contact :
 National Research Fund
 6, rue Antoine de Saint-Exupéry
 P.O. Box 1777
 L- 1017 Luxembourg
 Tél. : +352 26 19 25 1
 Fax : +352 26 19 25 35
 E-mail : info@fnr.lu www.fnr.lu

Belgium

FNRS Fonds National de la Recherche Scientifique - Wallonie

FWO Fonds voor Wetenschappelijk Onderzoek - Vlaanderen



Research Foundation - Flanders

The FWO - Vlaanderen (Fonds voor Wetenschappelijk Onderzoek) activities are aimed at a push back of the frontiers of knowledge in all disciplines, stimulating and funding fundamental academic research at the universities in the Flemish Community and at scientific research institutes.



Research Foundation - Flanders



The Fonds National de la Recherche Scientifique has a mission statement to develop scientific research in general through researchers initiatives. It helps knowledge production and development through individual researchers sponsoring and through research programs within laboratories and departments from universities in the Belgian French Community (Communauté française de Belgique).

The FNRS action is thus mainly centered around researchers training and research development.

FNRS - Wallonie
 rue d'Egmont 5
 B - 1000 Bruxelles
 Phone +32 2 504 92 11
 Fax +32 2 504 92 92
mjsimoen@fnrs.be
www.fnrs.be

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 Egmontstraat 5
 1000 Brussels
 Phone +32 2 512 91 10
 Fax +32 2 512 58 90
post@fwo.be
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ICS INSTITUTE OF COMPUTER SCIENCE

FORTH FOUNDATION FOR RESEARCH AND TECHNOLOGY - HELLAS

<http://www.ics.forth.gr>

Mission

The mission of ICS is to perform high quality basic and applied research, to promote education and training, and to contribute to the development of the Information Society, at a regional, national, and European level.

Towards achieving these objectives, ICS develops innovative products and services, contributes to the creation, transfer, and diffusion of technical know-how, collaborates with recognized companies, creates spin-off companies, promotes incubators and science and technology parks, and performs studies of regional, national and European interest.

ICS is highly competitive at an international level, and many of its activities are carried out in the context of European collaborative research and development projects, which emphasize the development of Information Society Technologies and infrastructures in a number of domains of national importance and regional interest.

Research Laboratories and Centers

- Biomedical Informatics Laboratory
 - ♦ Centre for eHealth Technologies
- Computational Vision and Robotics Laboratory
- Computer Architecture and VLSI Systems Laboratory
- Human - Computer Interaction Laboratory
 - ♦ Centre for Universal Access and Assistive Technologies
- Information Systems Laboratory
 - ♦ Centre for Cultural Informatics
- Telecommunications and Networks Laboratory

Programmes


- Ambient Intelligence
- Information Security

Other Departments

- Department of Education and Training
- Department of Systems and Networks Administration
- Registry of [.gr] Domain Names Department
- W3C Greek Office

International Links

 **ERCIM:** Member of ERCIM since 1992

 **W3C:** The W3C Office in Greece is hosted by ICS since 1998

Budget

Annual Budget: approx. 8,5 MEuros

Staff

ICS employs a total of 260 people:

- 40 researchers and university faculty
- 100 technical personnel
- 20 administrative personnel & auxiliary personnel
- 100 graduate research assistants and trainees



The Institute of Computer Science is one of the seven institutes of the Foundation for Research and Technology - Hellas, a major national research centre, supervised by the General Secretariat for Research and Technology of the Hellenic Ministry of Development.



FOUNDATION FOR RESEARCH AND TECHNOLOGY - HELLAS (FORTH)
INSTITUTE OF COMPUTER SCIENCE

GR-700 13 Heraklion
Crete, Greece
TEL: +30 2810 391800
FAX: +30 2810 391801
EMAIL: ics@ics.forth.gr
URL: www.ics.forth.gr



Fraunhofer Verbund Informations- und Kommunikationstechnik

The Fraunhofer ICT Group (Fraunhofer Information and Communication Technology Group) develops joint strategies and visions for application-oriented research on information and communication technology. It combines the core competencies of the 13 member and 2 guest institutes to create comprehensive research programs and offers support in technology transfer activities and research marketing. This makes it the largest research alliance for information and communication technology in Europe, and one of the biggest in the world.

The complementing core competencies of member institutes cover the full value chain within the communication and IT sector.

The Fraunhofer ICT Group provides its product portfolio to partners from industry and the public sector. The range of services includes customized IT solutions, specialized technology consulting, and preliminary research for new products and services. Being members within international research programs, the institutes are internetworked worldwide with business and research companies in the communication and IT sector. The business office of the ICT Group in Berlin acts as a »one-stop shop« to find the right partner for your need.



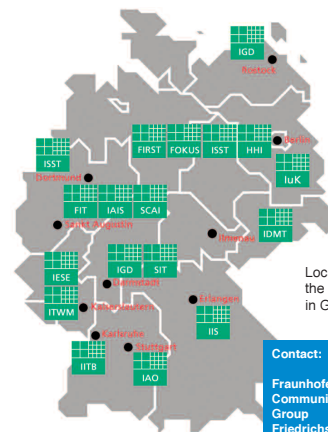
Information and Communication Technology for

- Medicine and Life Sciences
- Traffic, Transport and Mobility
- Production
- Digital Media
- Culture and Entertainment
- Software
- Communication Systems and Interdisciplinary Applications
- E-Business
- E-Government
- Security



■ **Budget**
Annual budget:
approx. 176 million €

■ **Staff**
Approx. 3000 scientific
and administrative staff



Locations of the institutes in Germany

Contact:

Fraunhofer Information and Communication Technology Group
Friedrichstr. 60
10117 Berlin
phone: +49 30 726 15 66 0
fax: +49 30 726 15 66 19
e-mail: info@luk.fraunhofer.de
www.luk.fraunhofer.de



Institut National de Recherche en Informatique et en Automatique

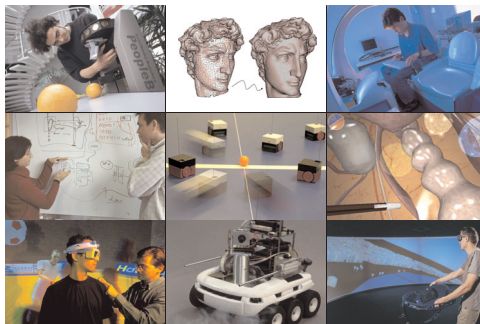
INRIA is the French National Institute for Research in Computer Science and Control, operating under the dual authority of the Ministry of Research and the Ministry of Industry. Its decentralized organization in six Research Units

- INRIA Futurs (Lille, Bordeaux, Saclay)
 - INRIA Grenoble - Rhône-Alpes
 - INRIA Nancy - Grand Est
 - INRIA Paris - Rocquencourt
 - INRIA Rennes - Bretagne Atlantique
 - INRIA Sophia Antipolis - Méditerranée
- spread over France enables INRIA to network skills and talents from the fields of ICT.

INRIA headquarters are located in Rocquencourt. INRIA is a co-founder of ERCIM and hosts the ERCIM office.

■ Mission

- fundamental and applied research in mathematics, computer science and related topics
- designing prototypes and experimental systems
- technology and knowledge transfer
- promoting scientific international co-operation
- provide expertise.



■ Co-operation and knowledge transfer

The transfer of research results towards industry is one of INRIA's main assignments, in addition to its fundamental and applied research in computer science and control. This industrial transfer takes place at three different levels:

- contracts and partnership with industry (currently some 730 contracts)
- development initiatives
- the setting up of high-tech companies (some 83 companies since 1984).

■ Research

- INRIA focuses its research on seven great research challenges for 2003-2007:
- designing and mastering the future network infrastructures and communication services platforms
 - developing multimedia data and multimedia information processing
 - guaranteeing the reliability and security of software-intensive systems
 - coupling models and data to simulate and control complex systems
 - combining simulation, visualization and interaction
 - modeling living structures and mechanisms
 - fully integrating ICST into medical technology.

■ Budget

- Total annual budget: €162 million, thereof
- 80% basic national funding
 - 20% own resources.

■ Staff

- 2900 scientific staff including some 1000 PhD students
- 740 supporting and administrative staff.



Contact:
INRIA
Domaine de Voluceau
BP 105
F-78153
Le Chesnay Cedex
France
Tel: +33 1 3963 5511
Fax: +33 1 3963 5330
email: info@inria.fr
http://www.inria.fr



Irish Universities Association

The Irish Universities' Association (IUA) is the representative body of the Heads the seven Irish universities. It is a non-profit making body with charitable status.

The IUA seeks to advance university education and research through the formulation and pursuit of collective policies and actions on behalf of the Irish Universities thereby contributing to Ireland's social, cultural and economic well being.

■ Irish Universities

The Irish University Association represents all seven Irish universities. These include the three Dublin-based universities of Dublin City University, Trinity College and University College Dublin, and the four regional universities of University College Cork, National University of Ireland in Galway, University of Limerick, and National University of Ireland in Maynooth.

As all seven Irish Universities comprise the IUA, the range of research themes is exhaustive.

At present, Dublin City University are responsible for ERCIM-related administration and coordination activities.

■ Focus on Dublin City University

Dublin City University promotes four broad research themes.

Dependable Systems

The focus of this theme is the development of reliable and secure software. This encompasses a number of different approaches to ensuring the dependability of software from softer approaches through software development methods and software project management, to more formal approaches through refinement, verification and automatic program construction.

Information Management

This theme has two major research areas: Digital Multimedia and Database Engineering and Interoperable Systems. The Centre for Digital Video Processing (CDVP) researches and develops techniques and tools to automatically analyse and index digital video information, and allow content-based operations. The Database Engineering and In-

teroperable Systems researchers develop formal and informal models for constructing database systems, and building semantic layers between heterogeneous information systems.

Language & Intelligence

This theme is primarily involved in research into and development of applications in two main areas. In the Speech and Language Processing area, the research themes include Machine Translation, Speech Processing, Computational Models of Semantics, Treebanks, Formal Syntax, Digital Signal Processing, Computer-Assisted Language Learning, Probabilistic Natural Language Processing and Parsing. In the area of Artificial Intelligence, the themes include Artificial Minds, Computational Models of Cognition, Knowledge Representation, Human-Computer Interaction, Cognitive Science, The Origins of Intelligence, Neural Networks and Autonomous Agents.

Modelling & Scientific Computing

The group explores models of the natural and artificial world, through computer solutions of problems, which due to their complexity, are intractable by conventional methods. Complex systems arise in a variety of fields, e.g. physics, biology, chemistry, eco-and other hybrid sciences, finance, socio-economic phenomena, and many others. Much of the current focus of the work is in Biocomputation, (e.g. Bioinformatics and Biodiversity).



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Tel: +3531 7005636
Fax: +3531 7005442
http://ercim.computing.dcu.ie/





NTNU, the Norwegian University of Science and Technology, represents the Norwegian research community in informatics and mathematics, including associated departments at SINTEF, the University of Oslo, the University of Bergen, the University of Tromsø and the Norwegian Computing Centre in Oslo.

The university's Faculty of Information Technology, Mathematics and Electrical Engineering (<http://www.ime.ntnu.no/eng/>) has primary responsibility for ERCIM activities, although relevant research is conducted in different university departments and through the university's strategic research agenda in ICT (<http://www.ntnu.no/ikt/>).

■ **Collaborative efforts**

NTNU's research staff is engaged in some 2000 R&D projects, while the university itself hosts between 20 and 30 major scientific conferences in an average year. NTNU has bilateral agreements for student exchanges with more than 200 non-Norwegian universities across the globe. NTNU also has a close working relationship with SINTEF, Scandinavia's largest independent research institute, which has about 2000 employees. SINTEF was originally established by NTNU, and those origins are reflected in the SINTEF buildings, located on the university campus. This co-location further promotes the synergies that result from cooperative research.

■ **The Faculty of Information Technology, Mathematics and Electrical Engineering**

The faculty has 270 academic staff and doctoral students, and is responsible for approximately 20 percent of the educational activity at NTNU.

- Department of Computer and Information Science
- Department of Electronics and Telecommunications
- Department of Electric Power Engineering
- Department of Mathematical Sciences
- Department of Engineering Cybernetics
- Department of Telematics.

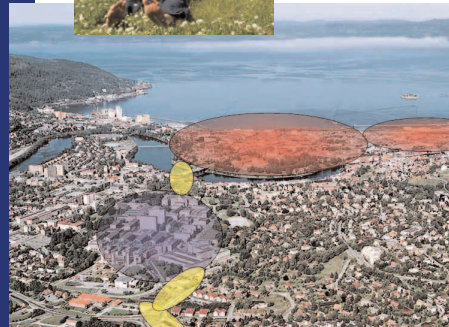
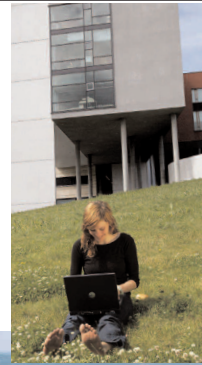
■ **Strategic research**

The university's strategic ICT research addresses the following areas:

- Computational Science and Visualization
- Bioinformatics
- Health Informatics
- ICT in the Public Sector (eGovernment)
- Information Security
- Learning with ICT
- Language Technology
- ICT Basics
- ICT and Globalization.

■ **Contact**

Norwegian University of Science and Technology
Faculty of Information Technology Mathematics and Electrical Engineering
N-7491 Trondheim, Norway
Tel: +47 73 59 80 35, Fax: +47 73 59 36 28
<http://www.ime.ntnu.no/>



Technology, software and Internet protocols that may work fine in a laboratory setting may fail under real-world pressures of commercial use. Wireless Trondheim, launched in September 2006, makes the inner city of Trondheim available as a working environment in which to test tomorrow's wireless technology. The project is a cooperative among industrial partners, NTNU, the city of Trondheim, the Sør-Trøndelag county council, and the Trondheim Chamber of Commerce.

Universitas Varsoviensis



Universitas Wroclaviensis

*Polish Research Consortium
for Informatics and Mathematics*



Two major Polish universities - the University of Warsaw and the University of Wrocław - established together a new research consortium, 'PLERCIM' in January 2007, which represents Poland in ERCIM. PLERCIM will initiate and coordinate future cooperation between Polish and European researchers in applied mathematics and informatics within ERCIM activities.

Auditorium Novum, Warsaw University.



■ **The University of Warsaw**

The University of Warsaw (Universitas Varsoviensis, est. 1817), is the largest university in Poland. It teaches over 56 000 undergraduate students and around 2100 PhD students in nineteen faculties. About 11 000 students graduate from the University every year. It offers a broad range of courses taught in Polish and English in 76 areas of study. The Faculty of Mathematics, Informatics and Mechanics, with almost 170 faculty members and researchers, is engaged in a wide spectrum of research areas, ranging from pure mathematics and theoretical computer science, to applied mathematics and applied areas of informatics. The Faculty consists of three Institutes: Mathematics (with over ninety faculty members), Informatics (almost fifty faculty members), and Applied Mathematics and Mechanics (with over thirty faculty members).

■ **The University of Wrocław**

The University of Wrocław (Universitas Wroclaviensis, est. 1702) is the largest university in the south-western part of Poland called Lower Silesia. It teaches over 40 000 undergraduate students and about 1300 PhD students in ten faculties. About 9000 students graduate from the University every year. The University offers a broad range of courses taught in Polish and English in over seventy areas of study. The Faculty of Mathematics and Computer Science consists of two parts: the Mathematical Institute and the Institute of Computer Science. It teaches 870 undergraduate students in mathematics, 520 undergraduate students in computer science and 50 students in PhD programmes in both disciplines.



The Aula Leopoldina in the main building of the Wrocław University.

■ **Budget**

- Total annual budget:
€10,5 million, thereof
- 90% basic national funding
 - 10% national and international programmes.

■ **Staff**

- 400 scientific staff
- 100 supporting and administrative staff.

■ **Contact**

PLERCIM Office
Faculty of Mathematics, Informatics, and Mechanics
Warsaw University, Banacha 2
02-097 Warszawa, Poland
<http://www.plercim.pl/>



**Science & Technology
Facilities Council**



**Research at the
Leading Edge**

Formed by Royal Charter in 2007 (by combining CCLRC and PPARC), the Science and Technology Facilities Council is one of Europe's largest multidisciplinary research organisations supporting scientists and engineers world-wide. The Council operates world-class, large scale research facilities and provides strategic advice to the UK government on their development. It also manages international research projects in support of a broad cross-section of the UK research community. The Council also directs, coordinates and funds research, education and training.

The Council has responsibility to ensure that the UK scientific community has access to the large facilities that will enable it to perform high quality, world leading research in the future :

- Central Laser Facility (CLF)
- ISIS pulsed neutron and muon source
- Isaac Newton Group of Telescopes (ING)
- Joint Astronomy Centre (JAC)
- United Kingdom Infra-Red Telescope (UKIRT)
- James Clerk Maxwell Telescope (JCMT)
- Diamond Synchrotron (DLS)
- Synchrotron Radiation Source (SRS).

Right: Atlas 5 Petabyte Data Store.

Bottom: Visualisation of a model of the human heart from the Integrative Biology project (© STFC).



■ Computing Facilities

STFC hosts a range of national computing facilities to support the data, computing and networking needs of UK researchers. These include:

- The UK National Grid Service (NGS)
- The UK e-science certification authority (CA)
- The UK role in the European Computing Grid (EGEE)
- The UK Grid for Particle Physics (PPGrid)
- The computing cluster for the Minerals and Ceramics Consortium
- The computing cluster for the EPSRC National Service for Computational Chemistry Software
- The Scientific Computing Application Resource for Facilities
- The 5 Petabyte Atlas Data Store
- HPCx a super computer with a processing capability of 15 Teraflops, 18 TByte data store and Gigabit Network
- National Academic Mailing List Service (NAMLS)
- The STFC e-publications archive (e-pubs).

■ Recent Applications

Integrative Biology - The project has brought together an international consortium of leading biomedical and computing researchers to address two of the most important problems in clinical medicine today: understanding what causes heart failure and how cancer tumours develop and grow. The Integrative Biology project is developing tools and services to help life scientists build and manage the computer simulations they need to advance their research.

e-Materials - A combination of novel computational and computer science methodologies and teams are being used to develop Grid e-Science technologies to deliver new simulation solutions to problems and fields relating to combinatorial materials science and polymorph prediction. The project exploits the latest developments in scientific simulation methodologies (both electronic structure and force field based) and hardware ranging from desktop to High Performance Computing.

■ Partnerships

Can range from a one-off contract to truly integrated partnerships, collaborating with the Council's staff.

■ Budget and Staffing

Budget for IT related areas: € 22 million

- 80% research council contracts
- 20% income from government departments, European Commission, universities and industry.

Around 2100 total staff, 180 IT staff (average whole-time equivalent).



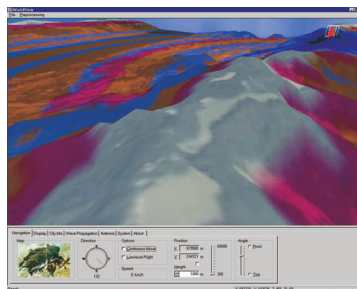
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**SARIT – The Swiss Association
for Research in Information Technology**



SARIT is a nonprofit association with the goals of fostering national and international collaboration within the ICT research community and of promoting the visibility and recognition of ICT research performed in Switzerland.

SARIT was founded in 1989 with the purpose of linking together the mostly small Swiss research groups in computer science and of promoting international collaboration. In 1998, SARIT was completely restructured; all professors in ICT-related topics at Swiss universities and Federal Institutes of Technology became individual members of SARIT together with industry-based ICT research units. Nowadays, after the advent of the Universities of Applied Science, SARIT also has members belonging to these institutions.



Automatic Antenna placement with WorldView.

SARIT runs a WEB site <http://www.sarit.ch/> providing information about ICT-related research activities and events in Switzerland.

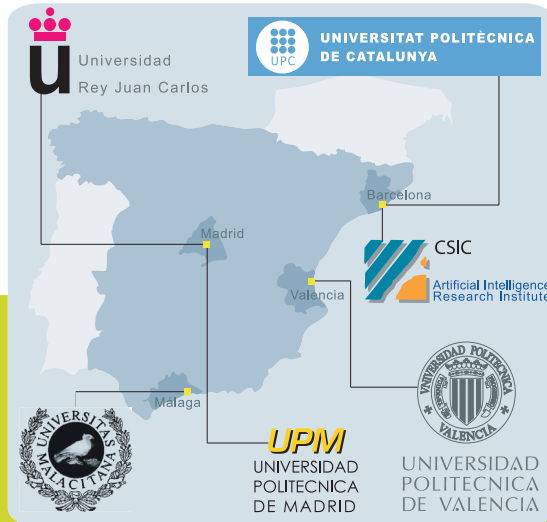
SARIT organizes an annual series of conferences. "SARIT 07, Computing for Health" is scheduled for 15 May, 2007. <http://www.sarit.ch/events/sarit07.html>.

SARIT is the Swiss member of ERCIM. For this cooperation, SARIT plays the role of a "virtual research center" combining the efforts of the distributed Swiss IT research community and being its representative to all other ERCIM partners, eg. for the post-doctoral exchange program.

SARIT maintains offices at the Swiss Federal Institute of Technology (EPFL) in Lausanne.



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SpaRCIM

SpaRCIM was founded under the auspices of the Spanish Ministry of Education and Science. Its main goal is to spread the activities of the ERCIM consortium to the informatics and mathematics research communities within Spain. The consortium is composed of five universities and a research institute dependent on the Spanish Research Council (CSIC):

- . Artificial Intelligence Research Institute (IIIA)
- . Rey Juan Carlos University (URJC)
- . Technical University of Catalonia (UPC)
- . Technical University of Madrid (UPM)
- . Technical University of Valencia (UPV)
- . University of Malaga (UMA)

These Spanish institutions include a number of groups that are considered to be representative of Spanish research in computer science. These groups are working on a great variety of research areas within information technology and applied mathematics.

Research Topics

- | | |
|-------------------------------------|---------------------------------|
| Complexity Theory | Databases |
| Automata | Distributed Systems |
| Logic | Operating Systems |
| Combinatorics | Image Processing |
| Computational Geometry | Distributed Systems |
| Parallel and Distributed Algorithms | Advanced Man-Machine Interfaces |
| Neural Networks | Data Visualization |
| Formal Linguistic | Computer Networks |
| Computer Graphics | Knowledge-based Systems |
| Software Engineering | Chaos Theory |
| Web Engineering | |

Staff

About 450 researchers

Contact

Spanish Research Consortium for Informatics and Mathematics.

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Swedish Institute of Computer Science

The Swedish Institute of Computer Science (SICS) is the leading research institute of Sweden within the area of ICT. Highly qualified researchers conduct applied and fundamental research in strategic areas of computer and communication technologies, in close cooperation with industry and the international research community.

SICS undertakes research assignments for industry and actively participates in R&D programs funded by national and international bodies, such as VINNOVA and the European Commission.

SICS promotes exploitation of research results by cooperating with industry and society, encouraging start-up companies, providing open source software, and by participating in standardization programs, clusters, and media and public events.

MAIN RESEARCH AREAS

Intelligent Production

Monitoring, diagnosing, and optimizing industrial production

Human Grid

Representing, finding, and using human competence

Mobile Life

The future ecosystem of truly mobile services

Global Computing

Sharing resources through secure dependable, autonomic systems of services

Sensor Networks

Self-configuring, distributed, wireless sensor systems

Networked Systems

Building the future reliable Internet

ORGANISATION

Staff

90 researchers
(40 PhDs.)

Location

Stockholm (Kista)
Göteborg
Uppsala
Västerås

Turnover

€ 9.5 million

SICS is a part of
Swedish ICT Research.



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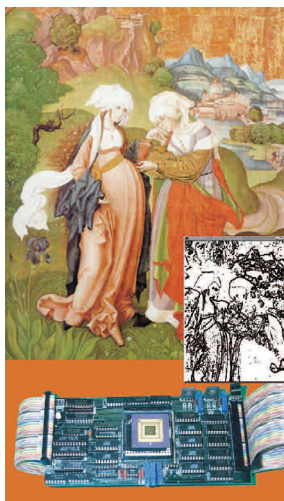
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SZTAKI – Computer and Automation Research Institute Hungarian Academy of Sciences

SZTAKI is the Hungarian representative of ERCIM. SZTAKI was granted the prestigious title of EU Centre of Excellence in Information Technology, Computer Science and Control in 2001.



■ Mission

SZTAKI's mission is to carry out basic and application-oriented research in an interdisciplinary setting in the field of computer science, intelligent systems, process control, wide-area networking and multimedia. The activities cover the C³I – computing, control, communication and intelligence – quadruple. SZTAKI's mission includes the transfer of up-to-date results and research technology to university students and the Institute runs four external university departments.

■ Research Programme

- Computer Science and Information Technology
- Applied Mathematics
- Automated Control Systems
- Artificial Intelligence
- Analogical and Neural Computing
- Integrated Design and Control Systems.

A new analogic cellular supercomputer system, a visual microprocessor, performs a trillion operations per second.

■ Co-operation and Knowledge Transfer

SZTAKI has wide external relationships in its R&D profile. In addition to ERCIM the Institute is a member of the W3 Consortium, of the European Software Institute and of other international organizations. Researchers of SZTAKI contribute extensively to European scientific co-operation projects. Some research programmes are supported by US Agencies, including NSF, ARO and ONR.

■ Budget

Total annual budget: 14 million €

- Basic national funding: 34%
- Participation in (inter)national research programmes and from contracts with industry: 66%.

■ Staff

- researchers on payroll: 204
- supporting staff: 82



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Technical Research Centre of Finland

VTT Technical Research Centre of Finland is a multidisciplinary research centre. Its R&D activities comprise the whole ICT value chain from micro-electronics and microsensing, wireless telecommunication networks to

media technologies, information systems and usability issues. Part of the work is carried out as large research projects, part is done as confidential contract research for the industry thus creating business from technology.

■ Core R&D VTT Information Technology

Semiconducting materials, micromechanics, measurement technology, sensors, integrated circuits, antennas, rf technology, photonics, networks, optical networking, traffic and performance analysis, mobility, switching and routing, location techniques, remote sensing, service platforms, ubiquitous computing, video/audio, usability, user interface and VR, wellness applications, multiple media, information carriers, datamining, language engineering, product information management, transport management.

■ Recent Applications

- **QUARTZ REPLACED WITH SILICON IN TIMING CIRCUIT**
VTT and VTI Technologies have developed a new micro-resonator in which the quartz crystal is replaced with silicon. This opens up entirely new opportunities to reduce the size and weight of electronic devices and to improve their performance.
- **AN ADVANCED NANO IMPRINTING STEPPER**
VTT and SUSS MicroTec S.A.S. have developed the most versatile nano imprinting stepper on the market. The stepper and the new methods enable fast, low-cost production of flexible solar cells and nano-scale bioanalysis platforms (Lab on a Chip).
- **FASTER DATA TRANSFER IN ELECTRONIC DEVICES**
VTT has been a leading force in the development of optical data transfer technology suitable for the mass production of electronics equipment. This new technology will increase the efficiency of electronics devices

many times over. According to several major electronics manufacturers, a breakthrough for optics in electronic devices is expected in a few years' time.

- **FASTER REMOTE CONSULTATION FOR PATIENTS GLOBALLY**
VTT together with the Singaporean research centre A*Star (Agency for Science, Technology and Research), has developed a web-based platform that offers an efficient, open, scalable and secure environment for remote diagnostics and telemedicine services.
- **BIOMARKERS REVEAL STATIN-INDUCED MUSCLE INJURY**
Statins are effective and safe cholesterol-lowering drugs, but high doses increase the risk of statin-induced muscle injury. VTT and the Tampere University

Hospital recently identified muscle-sensitive biomarkers that can be used to detect unwanted and potentially toxic statin-induced changes in muscle metabolism.

- **NEW INDUSTRY FROM PRINTED INTELLIGENCE**
By combining IT, electronics and printing technologies, VTT is creating entirely new business opportunities based on printed smart products. In collaboration with a number of companies, VTT is using the roll-to-roll technology to develop innovative, printed smart products.

■ VTT hosts Millilab

Millilab is an external laboratory on Millimetre Wave Technology. The main purpose of MilliLab is to support European space industry to meet the demands of future ESA missions. Non-space companies and organizations use our expertise on millimetre wave technology as well.



■ Staff
VTT: 2700

■ Budget
Turnover 2006: €219 million

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Scientific Fields of Competencies

Informatics

		AARIT	CNR	CRCIM	CWI	FHG	FNR	FNRS & FWO	ICS-FORTH	INRIA	IUA	NTNU	PLERCI	STFC	SARIT	SICS	SparCIM	SZTAKI	VTT
B. Hardware	B.1 Control structures and microprogramming (D.3.2)				X	X	1		X		X				X				
	B.2 Arithmetic and logic structures				X	X			X	X	X		X		X				
	B.3 Memory structures				X		1	X	X	X					X				
	B.4 Input/output and data communications				X		1	X	X	X	X				X	X			X
	B.5 Register-transfer-level implementation				X		1	X	X	X					X				
	B.6 Logic design			X	X	X	2	X	X	X	X	X			X				
	B.7 Integrated circuits			X	X	X	4	X	X	X	X				X				X
	B.8 Performance and reliability (C.4)		X			X	X	3	X		X	X			X				
C. Computer Systems Organization	C.1 Processor architectures			X	X		3	X	X	X	X				X				
	C.2 Computer-communication networks	X	X	X	X	X	5	X	X	X	X	X	X	X	X	X		X	X
	C.3 Special-purpose and application-based systems (J.7)	X	X		X	X		X	X	X					X	X			
	C.4 Performance of systems	X	X	X	X	X	4	X	X	X	X				X	X			X
	C.5 Computer system implementation	X			X		1	X	X	X	X				X				
D. Software	D.1 Programming techniques (E)	X	X	X	X	X	6	X	X	X	X	X			X	X	X	X	X
	D.2 Software engineering (K.6.3)	X	X	X	X	X	8	X	X	X	X	X	X	X	X	X	X	X	X
	D.3 Programming languages	X	X	X	X	X	6	X	X	X	X	X			X	X	X	X	X
	D.4 Operating systems (C)	X		X	X	X	2	X	X	X	X	X			X	X	X	X	X
E. Data	E.1 Data structures	X	X	X	X	X	5	X	X	X	X	X			X	X	X		
	E.2 Data storage representations	X	X	X	X		2	X	X	X	X	X			X	X	X		
	E.3 Data encryption	X	X	X	X	X	2	X	X	X	X	X			X	X	X	X	
	E.4 Coding and information theory (H.1.1)	X	X	X	X	X	3		X	X	X	X			X	X	X	X	
	E.5 Files (D.4.3, F.2.2, H.2)	X	X	X	X		1		X	X					X				
F. Theory of Computation	F.1 Computation by abstract devices	X		X	X		2	X	X	X			X		X	X			
	F.2 Analysis of algorithms and problem complexity (B.6, B.7, F1.3)	X	X	X	X		6	X	X	X	X	X			X	X		X	
	F.3 Logics and meanings of programs	X	X	X	X	X	4	X	X	X	X	X			X	X	X		
	F.4 Mathematical logic and formal languages	X	X	X	X		8	X	X	X	X	X			X	X	X	X	X
G. Mathematics of Computing	G.1 Numerical analysis (MSC 65, 33-35)	X	X	X	X	X	7		X	X	X	X	X	X	X	X		X	X
	G.2 Discrete mathematics (MSC 05, 06)	X	X	X	X	X	4	X	X	X		X	X	X	X	X	X	X	X
	G.3 Probability and statistics (MSC 60, 62)	X	X	X	X	X	6	X	X	X		X			X	X	X	X	X
	G.4 Mathematical software	X		X	X	X	5		X	X	X	X	X	X	X	X	X	X	X
H. Information Systems	H.1 Models and principles	X	X	X	X		4		X	X	X	X	X	X	X	X	X	X	X
	H.2 Database management (E.5)	X	X	X	X	X	5	X	X	X	X	X	X	X	X	X		X	X
	H.3 Information storage and retrieval	X	X	X	X	X	5	X	X	X	X	X	X	X	X	X	X	X	X
	H.4 Information systems applications	X	X	X	X	X	5	X	X	X	X	X	X	X	X	X	X	X	X
	H.5 Information interfaces and presentation (e.g., HCI) (I.7)	X	X	X	X	X	4	X	X	X	X	X	X	X	X	X	X	X	X
I. Computing Methodologies	I.1 Symbolic and algebraic manipulation					X	4		X	X		X		X	X	X	X	X	
	I.2 Artificial intelligence	X	X	X	X	X	6	X	X	X	X	X			X	X	X	X	X
	I.3 Computer graphics	X	X	X	X	X	4	X	X	X	X	X	X		X	X		X	X
	I.4 Image processing and computer vision	X	X	X	X	X	8	X	X	X	X	X	X		X	X		X	X
	I.5 Pattern recognition	X	X	X	X	X	6	X	X	X		X			X	X	X	X	X
	I.6 Simulation and modeling (G.3)	X	X	X	X	X	5		X	X	X	X	X	X	X	X		X	X
	I.7 Document and text processing (H.4, H.5)	X	X	X	X	X	3		X	X		X			X	X	X		X
J. Computer Applications	J.1 Administrative data processing	X				X	1						X	X	X				X
	J.2 Physical sciences and engineering	X	X	X	X	X	2	X	X	X					X	X	X		
	J.3 Life and medical sciences	X	X	X	X	X	6	X	X	X	X	X			X	X	X		X
	J.4 Social and behavioral sciences	X			X	X	X		X	X	X				X				
	J.5 Arts and humanities	X	X	X	X	X	X		X			X			X	X			
	J.6 Computer-aided engineering	X	X			X	X		X	X	X			X	X				X
	J.7 Computers in other systems (C.3)	X					X		X	X					X	X			
K. Computing Milieux	K.1 The computer industry								X						X				
	K.2 History of computing	X					1		X	X					X				
	K.3 Computers and education	X	X		X		3	X	X	X		X			X		X		
	K.4 Computers and society	X				X	1	X	X	X					X	X			
	K.5 Legal aspects of computing		X				1								X				
	K.6 Management of computing and information systems	X	X			X	2		X	X					X	X	X		
	K.7 The computing profession														X	X			
	K.8 Personal computing	X	X						X						X	X			

The categories used for the informatics part of the ERCIM table of competences are the top two levels of the internationally accepted ACM Computing Classification System [1998 Version]. The ERCIM table subsumes more detailed distinctions available from the full ACM CCS (<http://www.acm.org/class/>) which includes additional levels of description.

FNRS-FWO: The figures refer to the number of Belgian institutes active in this field.

Mathematics

	AARIT	CNR	CRCIM	CWI	FHG	FNR	FNRS & FWO	ICS-FORTH	INRIA	IUA	NTNU	PLERCIM	STFC	SARIT	SICS	SpaRCIM	SZTAKI	VTT
00 General				X	X	X	2						X	X	X			
01 History and biography				X									X	X				
03 Mathematical logic and foundations			X	X			5	X	X				X	X		X		
05 Combinatorics			X	X	X		2	X	X				X	X	X	X	X	
06 Order, lattices, ordered algebraic structures	X		X				2	X	X				X	X		X	X	
08 General algebraic systems	X		X				1	X					X	X		X		
11 Number theory			X	X			2						X	X			X	
12-22 Algebra			X		X		5	X	X	X			X	X		X		
26 Real functions					X		1			X			X	X				
28 Measure and integration							1	X					X	X				
30 Functions of a complex variable					X		3			X			X	X				
31 Potential theory										X			X	X				
32 Several complex variables and analytic spaces							1	X	X	X			X	X			X	
33 Special functions								X	X	X			X	X				
34 Ordinary differential equations			X	X	X		4	X	X	X			X	X			X	
35 Partial differential equations			X	X	X		5	X	X	X			X	X			X	
37 Dynamical systems and ergodic theory			X		X		3	X	X	X			X	X			X	
39 Difference and functional equations					X		3	X					X	X				
40 Sequences, series, summability										X				X				
41 Approximations and expansions				X	X		1	X	X	X			X	X			X	
42 Fourier analysis					X		4	X	X	X			X	X			X	
43 Abstract harmonic analysis					X		1			X			X	X			X	
44 Integral transforms, operational calculus							2							X				
45 Integral equations					X		1	X					X	X				
46 Functional analysis			X		X		5	X	X	X			X	X				
47 Operator theory			X				2			X			X	X				
49 Calculus of variations and optimal control; optimization			X		X		4	X					X	X		X	X	
51 Geometry			X			X	2			X			X	X			X	
52 Convex and discrete geometry				X	X								X	X			X	
53 Differential geometry			X		X		2			X			X	X			X	
54 General topology					X				X				X	X			X	
55 Algebraic topology	X						1	X	X	X			X	X		X	X	
57 Manifolds and cell complexes							1			X			X	X			X	
58 Global analysis, analysis on manifolds							2			X			X	X				
60 Probability theory and stochastic processes		X	X	X	X	X	5	X	X	X			X	X		X	X	
62 Statistics		X	X	X	X	X	6	X	X	X			X	X	X	X	X	
65 Numerical analysis		X	X	X	X		6	X	X	X			X	X		X	X	
70-86 Mathematical Physics				X	X	X	1			X	X		X	X				
90 Operations research, mathematical programming		X	X	X	X	X	5	X	X					X	X	X	X	
91 Game theory, economics, social and behavioral sciences		X	X	X	X	X	5	X						X			X	
92 Biology and other natural sciences		X		X	X	X	3	X	X	X	X		X	X	X		X	
93 Systems theory; control	X	X	X	X	X	X	5	X			X		X	X			X	
94 Information and communication, circuits					X		3	X	X				X					
97 Mathematics education			X		X		2						X	X				

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