Flanders' Research Area

Ministry of the
Flemish Community

Flanders' Research Area

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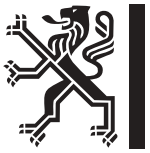

Ministry of the
Flemish Community

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Marleen Vanderpoorten

Dirk Van Mechelen

Preface

The social and economic progress of our societies is largely determined by the way in which they can produce, integrate and absorb scientific knowledge and technological know-how.

Throughout history, Flanders' prosperity and progress have been built by the creativity, the diligence and the perseverance of its population. Following the footsteps of the Flemish professor Baekelandt, who invented the bakelite, Flemish researchers have internationally patented an astonishing gamut of inventions in all scientific disciplines (ranging from electronics to environmental technologies), resulting in numerous cooperation treaties with companies from home and abroad.

Since science and technological innovation policy became regionalised competences within a federated Belgium, the Flemish Government has intensively supported scientific research and technological development by drastically augmenting its annual budget for Research and Development. Together with the business sector, the Flemish Government aims at yearly investing 2% of its Gross Regional Product in R&D.

Also, Flanders has always fully utilised its favourable geographical location, right in the heart of Europe. Its large seaports - Antwerpen, Zeebrugge and Gent - are equipped with a highly advanced harbour infrastructure. Its airports of Zaventem, Oostende and Antwerpen give direct access to the rest of Europe. Its well-kept highways and railways comprise one of the world's densest networks. In order to maintain and fortify its economic basis and international competitiveness ensuing from its infrastructural trump cards, Flanders has elaborated a Flemish-European head transport axis, consisting of a high-grade, highly diversified traffic and transport network connecting Flanders with its European hinterland.

Flanders has all the assets to be a meeting point for knowledge and talent. Networking and collaboration have indeed become keywords and Flanders is fully prepared and equipped to play its role in a globalising knowledge society. Universities, research institutes and companies participate in international research programmes, both in bilateral and multilateral frameworks. Flemish researchers can be found in laboratories all over the world, and in all major Flemish research institutes, foreign scientists work side by side with their Flemish colleagues. The European research area is in many aspects already a reality in Flanders.

This new edition 'Flanders' Research Area' is a second updated version of 'Scientific Research in Flanders' which was first issued in 1998. It offers a general overview of the administrative structures in science and technological innovation and of the knowledge centres in Flanders. The first part describes the main activities of the Science and Innovation Administration and its related agencies and advisory bodies. The second part gives an overview of the research organisations. The third part gives a general description of the Flemish universities. Part four focusses on the schools for higher education offering courses at an academic level and performing scientific and technological research. New in this edition is part 5: the collective research centres.

As such, the present publication acts as a source of information, not only for those research institutes and companies looking for scientific and technological collaboration, but also for those looking for investment opportunities in Europe and wondering if and where they will find the necessary technological base. The answer is in this book. Flanders is the place to come to.

Mrs. Marleen Vanderpoorten
Flemish Minister for Education and Training

Mr. Dirk Van Mechelen
Flemish Minister for Finance and Budget, Innovation, Media and Town and Country Planning

Administration, Advisory Bodies and Co-ordinating Organisations

PART 1

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Royal Flemish Academy of Belgium for Science and the Arts
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Flanders Marine Institute
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Flemish Institute for Science and Technology Assessment
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Science and Innovation Administration

Administratie Wetenschap en Innovatie (AWI)

Organisation

The Science and Innovation Administration (AWI) supports the Flemish Minister for Education and Training and the Flemish Minister for Finance and Budget, Innovation, Media and Town and Country Planning in the preparation and implementation of the policy. The Administration belongs to the Science, Innovation and Media Department of the Ministry of the Flemish Community. It was established through the Flemish Parliament Act on Administrative Policy which entered into effect on 12 December 1990.

Policy

AWI outlines a science policy for Flanders which is coherent in that it combines fundamental, applied and policy-oriented research into one policy. This science policy is tailored to the needs of the 21st century.

The aim of the science and technology policy in Flanders is to extend and deepen the basis of the scientific know-how and technological skills as a prerequisite for maintaining and increasing the population's prosperity and welfare.

The Administration has only a limited number of policy implementing tasks. It merely carries out tasks that cannot be implemented by others or that are of vital importance for policy preparation and evaluation, which is the AWI's core task.

The AWI promotes the optimum use of federal, European and international opportunities and brings our researchers into contact with other researchers as much as possible.

Activities

The main activities of the *'Science'* Division are:

- coordinating scientific research policy (focusing on academic research), within the Ministry of the Flemish Community and also with the relevant institutions and agencies. This also includes elucidating and defending the viewpoints of the Flemish Community in federal issues;
- establishing federal scientific cooperation as well as bilateral international collaboration. In this context, the Administration established bilateral contacts with the corresponding governmental organisations in the different priority partner countries. The long-term objective of this initiative is to stimulate solid cooperation between Flemish and foreign research groups which will in turn facilitate their joint submission of research proposals to different supra-national funding agencies;
- implementing the scientific research policy and monitoring its implementation by the Fund for Scientific Research Flanders as well as by the universities;
- providing the public with science information, the ultimate aim being to create a broad understanding of the importance of and the need for scientific research. To do this, an action plan for science information is set up each year. This action plan comprises actions for the popularisation of science (esp. for young people), such as the Flemish Science Week (organised every two years), as well as actions for the promotion of Flanders' scientific potential, such as the management of the IWETO data base, which gives an overview of all research groups and their line of research at the Flemish universities, and the elaboration of the administration's website;
- monitoring and executing specific tasks concerning policy research in general and the inter-university Policy Research Centres specifically. The main objective of the Policy Research Centres is to provide the Flemish government with up-to-date expert knowledge regarding (1) governmental organisation, (2) sports, movement, and health, (3) recreation and creativity, (4) traffic safety, (5) tourism and recreation, (6) environment and health, (7) equal opportunities, (8) sustainable agriculture, (9) environmental policy, (10) entrepreneurship, enterprises, and innovation, (11) careers in education, (12) R&D statistics, and (13) employment, labour, and education, respectively;
- monitoring the policy lines drawn by other - regional, national and international - governments and assessing their relevance and their impact on Flanders;
- preparing the science policy of the Flemish Government, in close cooperation with the 'Technology and Innovation' Division.

The *'Technology and Innovation'* Division executes the following tasks:

- coordinating the innovation policy, within the Ministry of the Flemish Community and also with the relevant institutions and agencies. This also includes elucidating and defending the viewpoints of the Flemish Community in federal and international fora and coordinating representation in such organisms (e.g. programme committee of EU framework programme, COST, OECD committees, UNESCO working parties,...).
- implementing technology and innovation policy and monitoring the implementation of this policy by the Institute for the Promotion of Innovation by Science and Technology in Flanders (IWT), as well as by the Collective Centres and Flemish Institute for Technological Research (VITO), the Flanders Interuniversity Institute for Biotechnology (VIB) and the Interuniversity MicroElectronics Centre (IMEC);
- monitoring the policy lines drawn by other - national and international - governments and assessing their relevance and their impact on Flanders;
- promoting and disseminating information about the European research programmes;
- preparing the technological innovation policy of the Flemish Government, in close cooperation with the 'Sciences' Division.

Under the direct supervision of the First Mandatory, the Science and Innovation Administration also has a *'monitoring function'* regarding science as well as technology, which involves the following activities:

- developing and implementing instruments to measure the effects of the science and technology policy and of the contribution of this policy to innovation;
- developing and implementing quality control instruments, which involves supervising the development and application of effective and efficient analytical instruments by the different actors;
- developing and maintaining an integrated system of indicators on science, technology and innovation, including organising the corresponding data collection;
- evaluating the performance of scientific research institutions, of specific actions including assessing their impact and effects;
- coordinating the strategic planning and elaborating the Horizontal Science Policy Budgeting Programme, an instrument used by the Flemish Government to generate its science and technology policy.

Further References

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Fund for Scientific Research - Flanders

Fonds voor Wetenschappelijk Onderzoek - Vlaanderen (F.W.O.)

1

Organisation

The Fund for Scientific Research - Flanders (F.W.O.) was founded in 1928 as an Institution of Public Interest for the support of scientific research, at the initiative of King Albert I. It has been supported by the national authorities since 1947 with the purpose of funding the universities. In 1988, its funding was mainly taken over by the Cultural Communities. Its structure was modified in 1992 and since then, the Flemish Board of Trustees has full autonomous powers of decision. The management exists of representatives of the Flemish universities, the Flemish and federal public authorities and the Flemish socio-economic community.

Policy

The F.W.O.'s 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. To sum up, one may say that the F.W.O. is Flanders' instrument for supporting and stimulating fundamental research and advancing its quality on the basis of academic, inter-university competition.

Fundamental research is sustained by first-rate, highly specialised researchers: it is the basis for new knowledge and its associated human capital open ways for the goal-oriented, applied, technological, strategic research. By creating prosperity and well-being it stimulates as well the concerned community as the society as a whole.

Activities

The F.W.O. endeavours to achieve its mission by:

- supporting individual researchers
  - young university graduates can prepare a doctoral thesis with the Research Assistantship or the Special Doctoral Grant;
  - young clinicians can obtain half-time a Clinical Doctoral Grant to complete their PhD thesis;
  - PhD's can reach an internationally recognised level as Postdoctoral Fellows. They can also obtain a mobility grant;
  - experienced clinicians can be granted half-time research mandates as Senior Clinical Investigators;
  - operating and equipment funding for personal research for young and/or established researchers.

- supporting prominent research teams
  - operating, equipment and personnel funding are made available to research teams in order to carry out high-level scientific projects.

- promoting (national and international) scientific contacts and cooperation
  - establishing Scientific Research Networks for co-ordination, national and international cooperation concerning scientific research at the postdoctoral level;
  - junior and senior visiting postdoctoral fellowships to sustain F.W.O. research projects and scientific research networks;
  - sabbatical leaves;
  - grants for study and training periods abroad;
  - grants for active participation in international congresses abroad;
  - grants for organising international congresses in Belgium.

- granting scientific awards

- participation in international co-operation projects

The selections are done by the Boards of Referees, composed of highly specialised national and foreign experts, on behalf of the scientific community itself on the basis of external referee reports. The evaluation is done by scientific assessment of the research results by the Boards of Referees. The expenditure of the supported programmes, together with the bookkeeping and accounting of the F.W.O. is monitored by an independent company auditor, by each funding ministry, by the Inspectorate of the Exchequer and by the Auditor's Office.

Further References

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Institute for the Promotion of Innovation by Science and Technology in Flanders

Instituut voor de Aanmoediging van Innovatie door Wetenschap en Technologie in Vlaanderen (IWT)

1

Organisation

The Institute for the Promotion of Innovation by Science and Technology in Flanders (IWT) was established in 1991 by the Government of Flanders as a regional public institution to provide R&D and innovation support to Flemish companies. For this IWT has several financial tools and an annual budget of 150 million euro available to support projects.

Policy

In addition to direct funding, a variety of services is provided to the local industry in the field of technology transfer, partner search, information about international subsidy options, etc. All these activities have made IWT a focal point for R&D and innovation in Flanders.

Activities

Funding of industrial scientific-technological R&D IWT supports RTD-projects for industrial basic research activities, projects for industrial development activities, and projects for strategic basic research of industrial relevance. The RTD-projects are funded as follows :

- projects for industrial basic research activities: a subsidy of 50% of the overall project costs (with an additional 10% for SME's);
- projects for industrial development activities: a subsidy of 25% (with an additional 10% for SME's);
- in addition to the subsidy SME's can apply for a loan up to 80% of the project costs;
- projects for strategic basic research in specific RTD-programmes with industrial relevance: a subsidy of 100%;
- post-graduate grants and post-doctoral fellowships are fixed allowances.

The RTD-projects for industrial basic research or for industrial development are submitted by industrial enterprises. These are the so-called 'bottom-up' projects, in all scientific or technological disciplines, or in specific fields in the framework of action programmes or other schemes as decided by the Government of Flanders or by the Flemish Minister responsible for Technological Innovation Policy.
In the bottom-up approach, applications for RTD-support can be introduced continuously, and cooperation with universities or other research institutes is not mandatory. There is a special scheme for SME-projects.
In action programmes, cooperation with universities or research institutes is generally obliged, and applications are introduced following calls for proposals.
The decision to award a grant is taken by IWT's Board of Directors.

Support for strategic basic research projects of industrial relevance is applied for by universities or other research institutes in the framework of specific action programmes and by individual researchers in schemes for post-graduate grants or post-doctoral fellowships.

Services with regard to technology transfer and innovation in general The objectives for these services can be summarised as follows:

- IWT is the Innovation Relay Centre (IRC) of the European Commission for Flanders and can support Flemish companies for technology transfer in Europe;
- support for the valorisation of research results, not limited to valorisation within the company itself, but including opportunities for technology transfer;
- the co-ordination of the activities of all intermediary bodies involved in technological consultancy, subsidised by the government of Flanders;
- assistance to companies to participate in research programmes initiated by the European Commission. This assistance specifically includes:
  - the periodic distribution of relevant and specially adapted information related to those programmes;
  - logistic support, where necessary, in drawing up the application;
  - help in finding suitable partners in the other European countries.

IWT-products

Financial support for R&D projects for companies
- Eureka;
- Industrial Basic Research and Industrial Development;
- SME Innovation Studies and –Projects.

Financial support for research institutes and intermediary organisations
- Flemish Innovation Networks;
- Post-doctoral Fellowships;
- Post-graduate Grants;
- Sectorial Research Institutes;
- Strategic Basic Research at the Universities;
- University Interfaces.

Services
- EC R&D Framework Programme;
- Flemish IRC;
- Information and Awareness;
- Innovation Network;
- Intellectual Property Rights;
- International Networks;
- Technology Transfer Events.

IWT-Observatory
- inquiries;
- studies.

Further References

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Flemish Science Policy Council

Vlaamse Raad voor Wetenschapsbeleid (VRWB)

Organisation

The Flemish Science Policy Council (VRWB) is the advisory body of the Government and the Parliament of Flanders for science and technology policy. It was originally set up pursuant to the decision of the Government of Flanders of July 17, 1985. The 'December 15, 1993 Parliament of Flanders Act' establishing the Flemish Science Policy Council provided its legal basis.

The Council consists of a president and sixteen members. All are appointed on account of their expertise and/or their involvement in science and technology in Flanders. Six members are put forward by the VL.I.R. (i.e., the Flemish Inter-university Council) and six members are proposed by the employers' organisations and the trade unions represented in the SERV (i.e., the Flanders' Social and Economic Council). The Government of Flanders directly nominates the four remaining members and the president. There are also five ex-officio members with an advisory vote.

In order to study in-depth the issues raised and prepare the advisory opinions, the Council appeals to four permanent committees: the Science Policy Committee, the Technology Policy Committee, the Federal and International Co-operation Committee and the Budget and Finance Committee. The Council may also call in ad-hoc working parties or external experts to examine special issues or to carry out research projects.

Policy

The VRWB is authorised to formulate recommendations, to publish studies or reports and to give advice on any matter pertaining to scientific and technological policy, either on its own initiative or upon request. The request may be initiated by the Government of Flanders, by each member of that Government or by the Parliament of Flanders. More in particular, the VRWB is entitled to give advice and draw up proposals as to general policy lines and science policy priorities, training of research personnel, major trends in science policy, testing the efficiency of science policy organisation and measuring science policy through developments at the social, economic, technological and cultural levels.

The Council acts as the Flemish interlocutor and may also, as representative of Flanders, be associated with similar federal and international advisory bodies.

Activities

The VRWB is a unique forum where experts of the Flemish research and development activities, coming from the academic as well as socio-economic world, reflect on the key concepts of the research and technology policy to be pursued in Flanders. The Government of Flanders is legally bound to consult the VRWB on all draft Parliament of Flanders Acts and Bills regarding scientific and technological matters. When the present government took office, the VRWB presented its '20 items-Message' describing the VRWB-concerns and hopes for the future. Quite a lot of the VRWB recommendations are reflected in the annual policy papers specifying the policy priorities for science and technology, issued by the Ministers in charge.

The successive VRWB advisory reports regarding the Flemish Horizontal Budget Programmes for Science Policy are so often consulted that they have become very well known. In these reports, the Flemish budgetary means spent on research and technology are analysed. In particular, their long-term development as well as their position in a federal and international context is focused on. The latest report (June 2002) states that an important and continued budgetary effort for scientific research in Flanders is necessary to reach the European R&D-norm.

Besides providing advisory reports on request, the VRWB, to a large extent, also acts on its own initiative for study work, study days, analyses, etc. on topical subjects regarding science and technology policy. This frequently results in important recommendations for the Flemish policy. Examples are: the high profile 'Science as Culture' report, the analyses regarding space research within the scope of ESA, the report on intellectual property (IPR) in research valorisation, career opportunities for researchers, the valorisation of the doctorate, science and technology foresight studies, the development of a price deflator for R&D expenses, science and gender, bridging the gap between science and society, science sharing, etc.

In addition there are the VRWB-colloquia - now biennially - on subjects of interest, such as the VRWB '20 items' message for the Flemish science and technology policy, whether or not to steer scientific research, the essence of scientists for society,... These study days are intended to expose the major items of concern to the Council to a wide forum and to provoke controversy. The VRWB values good communication with the R&D-actors very highly.

Further References

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Royal Flemish Academy of Belgium for Science and the Arts

Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten (KVAB)

1

Organisation

The Royal Flemish Academy of Belgium for Science and the Arts (KVAB) is an autonomous, independent and multidisciplinary learned society for the practice and promotion of science and culture. HM the King is patron of the institution.

Members The academy has three classes: natural science, humanities, arts. Each class has a maximum of thirty full members: they are the backbone of the academy and have complete authority to make decisions by vote and to govern the academy. There are also up to ten inland associate members per class. They participate in meetings but have no vote, nor may they hold administrative office. Finally, the academy has honorary members, who retain their academic prerogatives but may no longer hold administrative office. Members are elected by the respective classes, and the sovereign must confirm their appointment. Candidates for membership must be proposed by at least three members. Full members are normally elected from among the associate members.

Management committee The academy is governed by a management committee consisting of the president, who chairs general meetings and meetings of the executive board; the permanent secretary, who is responsible for the day-to-day running of the academy; four representatives of each class (the director of the class, the deputy director, the retiring director, and one representative appointed by the class). The management committee supervises all aspects of the working of the academy, including personnel management and the annual budget.

Committees and commissions The academy is responsible for a large number of learned committees and commissions, some of which are discussed below. Some were created by joint action of several academies, while others were instituted by the academy alone. Nine committees are responsible for the following research projects: general linguistics; economic history, reconstruction of the national accounts of Belgium 1795-1953, history of religion, humanism in the Low Countries, classical studies, maritime history, history of law; sources of the history of science, sources of art in the Low Countries.

Policy

At request of the legislative or the executive power or at its own initiative the Academy advises on matters of social importance. The Academy contributes to the radiation of science and culture of the Flemish Community on a national and an international level.

The Academy serves as a focus of collaboration for scholars inside the country and a link between them and foreign scholars. Therefore, it organises meetings, symposia and colloquia, it offers publication opportunities to young scientists and scholars, promotes international relations with the help of foreign Academies (agreements with different Academies as well within the framework of ALLEA, ICSU, International Academic Union, EU Academies Council, IAP) and it carries out long-term publication projects.

Furthermore the Academy awards annual prizes, both from its own funds and from private foundations.

Finally, the Academy promotes collaboration with its Dutch-speaking sister Academies (the Royal Academy of Medicine of Belgium and the Royal Academy of Dutch Language and Literature of Belgium) and their French-speaking sister Academies, as well as with the Royal Academy of Overseas Sciences of Belgium (bilingual).

Activities

Every class also elects up to fifty foreign members, who cannot hold administrative office. Every class meets once a month except in July and August. The management committee meets once a month.

The Gold Medal of the Academy is bestowed every year upon a Flemish personality who excelled in the advancement of science and culture. The Academy also promotes since the beginning of 1999 the meeting of Flemish scientists and artists in specific fields (disciplines) in what is called 'contactfora'. This takes place in the framework of the Flemish Knowledge and Culture Forum.

Furthermore, under a same agreement between the government and the Academy, the latter established the Flemish Academic Centre for Science and the Arts (VLAC), a forum for international scientific contacts at the level of excellence.

The Commission for Belgian Diplomatic Documents, 1941-60, was jointly established in 1988 by the classes of the humanities of the two Belgian academies, Dutch and French speaking, at the request of the minister for foreign relations. Its task is the publication of Belgian diplomatic documents during the 1941-60 period. Two volumes were published in 1998, two volumes in 2001 and six volumes are in preparation.
The Royal Commission for History was formed in 1834 and was given appropriate statutes in 1976. It has sixteen members, eight Dutch- and eight French-speaking members, and it works autonomously under the patronage of the two Belgian academies of science and letters. Its task is to find, collate, analyse, and publish written sources of the history of Belgium, and to publish working documents for the study of Belgian history. So far the commission has published more than 1,250 volumes of source material, historical studies, and reference works. It publishes its own journal: 'Handelingen van de Koninklijke Commissie voor Geschiedenis'.
The Royal Commission for Toponomy and Dialectology, formed in 1926, is the advisory organ for the government on new place names. It has a Dutch- and French-Language section, each with fifteen members.
The Commission for the Dictionary for National Biography (Dutch language) has cooperated with three other Belgian academies (Dutch language) since the 1960s in the publication of fifteen volumes.
The Academy Committee for Science and Technology (CAWET) was formed in 1988. Ten members are from the academy and ten from industry. It works closely with the French-language organisation (CAPAS), and together they form the Belgian Academy Council of Applied Sciences (BACAS). BACAS studies the impact of technological development on society and prepares reports and provides advice for the government and leaders of industry.
The science classes of the Dutch- and French-speaking academies have formed National Committees for the various fields of pure and applied science covered by member unions of the International Council for Science (ICSU). These committees represent Belgium in the unions therein.
The academy also has a Centre for European Culture, founded in 1994.

Further References

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Flanders Marine Institute

Vlaams Instituut voor de Zee (VLIZ)

Organisation

The Flanders Marine Institute (VLIZ) was founded by the Government of Flanders, the Province of West-Flanders and the Fund for Scientific Research - Flanders. It is an autonomous institute with the legal status of a non-profit association and is financially supported by the Ministry of Flanders and the Province of West-Flanders. The organisational frame and objectives of VLIZ are stipulated in its statutes and five-yearly management agreements. The General Assembly of the non-profit association VLIZ, consists of representatives of the Ministry of Flanders, of the Province of West-Flanders, and of the Fund for Scientific Research - Flanders. It is the highest legal body and defines the general policies of VLIZ. The Governor of the Province of West-Flanders presides the Board of Directors that comprises academics from Flemish universities, representatives of governmental authorities, and delegates from the marine-related economic sector. The Board has decision-making responsibilities with regard to the functional and operational management of VLIZ and reports to the General Assembly. The daily running of VLIZ is taken care of by the Director and the Executive Committee according to the Board's decisions. The Scientific Committee advises the Board in scientific matters. Its constitution reflects the multidisciplinary marine scientific community of Flanders and is made up of marine researchers from the six Flemish universities, from Flemish and federal research centres, and of representatives from administrative departments concerned. Whenever appropriate, ad hoc Committees can be installed to treat specific matters and make recommendations.

Policy

VLIZ wants to give exposure to the marine and coastal scientific research of Flanders, whereby co-ordination and dissemination of information play key roles. It is an interface between the Flemish universities, the scientific institutes and governmental authorities. The aims are to help identify the policy needs, make scientific data accessible, transfer knowledge and provide advice whenever required. VLIZ acts as an intermediary for national and international cooperation, organises national and international symposia and workshops, grants scientific awards, produces and disseminates several newsletters and other publications, and maintains an integrated website. Finally, the institute wants to inform the public at large and help with training and education in marine sciences and keeps the media informed.

Marine scientific research in Flanders is carried out by the six Flemish universities, the research institutes and departments of the Flemish and federal authorities, and to a lesser extend by private enterprises. The major broad disciplines covered are: biology, earth sciences, chemistry, physics, aquaculture and fisheries, engineering, and maritime affairs. Most research teams are involved in multidisciplinary international projects, encompassing marine, coastal, estuarine, and deep-sea environments worldwide. Key-roles of VLIZ are to offer logistic support to the various parties, promote their acquired expertise internationally, and serve as an interface between the scientific community, public authorities, and the public at large. Annually the scientific articles of the Flemish marine researchers are bundled in the 'VLIZ Collected Reprints', and exchanged for publications of marine centres worldwide.

Activities

VLIZ supports the marine scientific research in Flanders and hereby integrates a number of important functional and operational tasks:

- creating an information and co-ordination centre for marine, coastal, and estuarine scientific research in Flanders. VLIZ functions as a co-ordination platform for policymaking, for federal and international cooperation and for logistic support of marine research;
- promoting Flanders with regard to marine scientific research. VLIZ provides information from and to the international community and serves as an international contact point for marine research in Flanders;
- setting up the Flanders Marine Data and Information Centre. The centre gathers various kinds of data, implements international standards and redistributes data nationally and internationally;
- establishing an oceanographic platform. VLIZ puts the research vessel 'Zeeleeuw' ('Sea lion') at the disposal of researchers and is responsible for the management, maintenance, and utilisation of shared research equipment and infrastructure;

- carrying out other science-supporting activities, with emphasis on popularisation and public awareness building. VLIZ manages a multimedia library devoted to marine sciences and the marine and coastal environment;
- offering advice or submit proposals upon request of governmental authorities or at its own initiative. VLIZ constitutes a contact point for different ad hoc assignments of the Ministry of Flanders.

VLIZ hosts the Flanders Marine Data and Information Centre (VMDC), which acquires and processes oceanographic data. The objectives of the data centre are:

- providing data and information to researchers, public authorities and other interested parties, in a suitable and prompt way;
- centralising the nationally and internationally available data of research groups and governmental authorities;
- developing and maintaining databases for interdisciplinary research, according to the established international standards;
- integrating various kinds of data, and perform consistency and quality controls.

The speed and efficiency, with which users can identify, locate, exchange, and use marine data and information, are of major concern to render quality services. Whenever possible, the information is disseminated through the World Wide Web. For specific target groups, data sets can be provided on CD-ROM.

In a first phase, the Data Centre has developed an extensive network of researchers, governmental authorities, and other parties managing data and information and/or have marine scientific expertise at their disposal. The co-ordinates of the partners as well as meta-information on the data sets they manage and the projects they are involved in, are made available on the VLIZ website. The interests of the Data Centre are primarily determined by those of the users. The data- and information management expertise of VLIZ can be made available to research groups, to jointly develop and disseminate products. Data management of interdisciplinary research projects and educational programmes are also being considered. Services are not restricted to data pertaining to the Flemish coast and Belgian continental shelf. Special attention, however, is given to the Southern Bight of the North Sea. The Data Centre actively seeks information on this region and tries to integrate various data sets. To meet these objectives, data-exchange agreements are made with relevant partners, in first instance with research teams of the Flemish universities, research institutes, and governmental departments with similar objectives. International activities are undertaken through close collaboration with the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The Data Centre is the National Oceanographic Data Centre (NODC) for Flanders, and is actively involved in several initiatives of the IOC Committee on International Oceanographic Data and Information Exchange (IODE).

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Flemish Institute for Science and Technology Assessment

Vlaams Instituut voor Wetenschappelijk en Technologisch Aspectenonderzoek
(viWTA – Samenleving & Technologie)

Organisation

The Flemish Institute for Science and Technology Assessment (viWTA) is a new parliamentary institution committed to facilitate and enhance the study of the consequences of new technological developments in a societal and parliamentary context. Within the Flemish Parliament, viWTA functions as an independent and autonomous institute. The operational focus of viWTA is on the reinforcement of the role of Parliament through information and its formal advisory function. Further, viWTA envisions the enhancement of the societal debate on technology and society issues which results in reports and newsletters for Parliament and communication with the general public. The fields of activity include:

- facilitation and structuring of the societal debates on technology and society issues among decision makers, experts, special interest groups and the general public and relating the feedback results with decision making processes and parliamentary debate;
- research project on policy and practice concerning the consequences of new technological developments (long term projects are contracted);
- foresight studies on scientific and technological developments.

For these activities, viWTA can rely on a permanent scientific staff: an executive director, three researchers, a secretary and a communications manager. viWTA is supervised by a board of directors, which consists of 8 members of Parliament and 8 representatives from academic or socio-economic institutions, and is presided by a member of Parliament. An executive committee (president, 2 vice-presidents and executive director) supervises the daily functioning.

Policy

As an independent and autonomous institute viWTA takes no formal position in the general debate on technology and society issues, but informs and advises the members of the Flemish Parliament in a transparent and timely manner on the social implications of current scientific and technological evolutions and policy. For this, its research includes both study and analysis of actual problems in the Flemish society and its components and issues as well as future-oriented activities such as foresight. By means of its foresight studies, viWTA identifies and analyses future developments in science and technology and puts them into a societal and policy framework. The information strategy focuses on enhancing the societal debate, and its destined public thus includes members of Parliament, but also experts, interest groups and the general public.

Activities

viWTA was formally established on July 17th 2000 by the Flemish Parliament, but its current (start-up) infrastructure and staff came into function from January 2002 onwards. Its current proceedings include the continuous follow-up on the debate concerning genetically modified organisms and (from August 2002 onwards) energy policy, the set-up of a future framework for expert advice, public debate and feedback forums, and laying the foundations for a consistent foresight network.

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Research Organisations

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Interuniversity MicroElectronics Centre (IMEC)

Interuniversitair Micro-Elektronica Centrum (IMEC)

Organisation

The Interuniversity MicroElectronics Centre (IMEC) headquartered in Leuven, was founded in 1984 and today is Europe's largest independent research centre in the field of microelectronics, nanotechnology, enabling design methods and technologies for Information and Communication Technology (ICT) systems. Today, IMEC has a staff of more than 1200 people including over 350 industrial residents and guest researchers. Its revenue of more than 120 million euro is derived from agreements and contracts with the Flemish government and companies, the EC, MEDEA+, the European Space Agency, equipment and material suppliers, and semiconductor and system-oriented companies worldwide.

Policy

By founding IMEC, the Flemish government wished to stimulate the development of new technologies in Flanders. IMEC's mission is to perform scientific research that runs 3 to 10 years ahead of industrial needs in the area of microelectronics, nanotechnology, design methods and technologies for ICT. By performing this mission, IMEC became the leading independent research centre in Europe in this field.

Activities

IMEC's balance between basic and application-oriented research, and its well-developed IPR (intellectual property ruling) policy form an attractive base for worldwide industrial collaboration.

IMEC has a 0.13µm pilot line and is ISO 9001 certified. IMEC develops all process steps and modules required for advanced CMOS technologies, concentrating on the 100nm technology node and below. Its advanced research is focused on a limited number of subjects, which are selected in view of the fundamental roadblocks in scaling down dimensions. These problems include the achievement of small dimensions in a controllable and reproducible way, the interconnection of different electronic components within a chip and within a system, the improvement of active components in a chip, the implementation of passive components, etc. Strategic research programs were set up on most of these topics, including advanced lithography (193nm and 157nm), high-k dielectrics for gate application, copper and low-k interconnects, cleaning, silicides, shallow junctions and sub-50nm devices. IMEC targets research and support towards the development of fully integrated, manufacturable silicon technologies with current emphasis on 130nm to sub-70nm generations. In addition, special modules for mixed analog/digital applications, BiCMOS and non-volatile memories are developed.

IMEC also develops embedded system design methods and technology that are essential to create smart networked devices for the intelligent environment. As we are now entering the post-PC era, people are interested in small portable appliances like PDAs, mobile phones, MP3 players, etc. We are evolving towards a smart environment (ambient intelligence) in which we will be surrounded by 'smart things' that communicate with each other, and thereby augment our consciousness, protect our health and globally connect people and objects.
This evolution has already entered the automobile sector where a lot of features are now based on sensors. Think about the latest car designs where the lights switch on when it gets dark. Similarly, future buildings will be equipped with sensors that monitor the air, light, energy or security and which automatically control the heating or illumination. Moreover, people who walk around in such a building will each carry their own network of appliances that allows for communication, multimedia availability, the follow up and control of their health, etc. The post-PC era will be a network era marked by global interconnectivity between man and man, man and appliances, and appliances themselves. This smart environment will be wireless connected to the Internet. Intelligence will be embedded in nearly all new products and services through which consumers will be surrounded by an invisible but very efficient 'electronic coat'. IMEC contributes to the development of this intelligent environment by performing research on further miniaturization coupled with a higher bandwidth, lower power consumption, reprogrammable and reconfigurable platforms, scalability of systems, Quality-of-Service (QoS) ...

The challenges to design these smart networked devices are twofold: support for heterogeneity and support for dynamic behavior. IMEC develops design methods and tools to facilitate this heterogeneous design space exploration and verifies them by developing advanced power and cost-efficient wireless Systems-in-a-Package (SiP),

using MCM-D (thin-film multi-chip-module) technology, for 5GHz wireless local area network applications and for wireless personal area networks. IMEC also develops design methods and tools to perform design space exploration for dynamic applications. They aim at reducing power consumption and at improving overall QoS; they support dynamic task creation as well as run-time hardware and software reconfiguration.

A majority of the smart devices in the intelligent environment of tomorrow will consist of several components that will be integrated in a single package (SiP). SiPs combine heterogeneous technologies in a flexible way to provide a unique functional system. They consist of several bare dies flip-chip interconnected to a substrate. Depending on the type of system the dies are RF chips or micro-electromechanical systems (MEMS) and sensor arrays combined with digital and analog ICs. IMEC develops RF SiP for wireless, detector SiP for optoelectronics, Bio SiP for biotech and Magneto SiP for magnetoelectronic applications. To create these systems, enabling technologies are necessary. That's why IMEC also develops high-density interconnection and packaging technology. Innovation in packaging technology includes thin-film technology, packaging on Cu/low-k and flip-chip technology. IMEC also develops MEMS, which combine electrical with mechanical, optical or (bio-)chemical functionality within one device. MEMS offer potential alternatives for the energy supply of integrated systems. The exploration of new packaging technologies and the research on MEMS are supported by reliability analysis. IMEC's research on new energy sources such as solar cells and power MEMS is important to make the smart environment a reality. IMEC develops a production process for bulk crystalline silicon solar cells towards industrial implementation. Other research activities include the search for new materials, concepts and technologies to improve the efficiency and the cost of future solar cells.

IMEC performs research on biosensors and molecular nanotechnology, based on its vision that cross-fertilization of different disciplines like material research, biochemistry and micro- and nanoelectronic fabrication techniques will create new ways of sensing, displaying and computing. For more than 10 years, IMEC has been investigating applications of nanotechnology for novel devices. Today, new topics in silicon nanoelectronics are being explored, such as advanced non-volatile memories, sub-50nm and quantum MOSFETs, and molecular interconnects for IC circuits. At the same time, research is expanded towards non-silicon nanotechnologies, with programs in magnetoelectronics, polymer electronics, biosensors and solid-state quantum bits. These activities cover basic concepts as well as potential application perspectives.

Training is of utmost importance in the rapidly evolving high-tech industry. That's why IMEC has set up in 1999 a Microelectronics Training Centre (MTC) to concentrate and expand its activities in dedicated training for the industry. MTC is based on IMEC's long-standing experience in industrial training. Its courses cover the whole spectrum of microelectronics and ICT, from integrated system design to processing and packaging. The courses are available to companies, institutes and universities worldwide.

IMEC's research on this wide range of topics is done in close collaboration with its associated laboratories in Ghent (INTEC and ELIS units of the Ghent University), in Brussels (ETRO unit of the University of Brussels), in Bruges-Ostend (microelectronics unit of the Katholieke Hogeschool Brugge-Oostende) and in Diepenbeek (IMOMEC unit of the Limburg University Centre).

As the most important European research centre in the area of microelectronics, nanotechnolgy and design methods and technologies for ICT systems, IMEC has an extensive infrastructure. The three buildings contain about 6,170m^2 computer area, 810m^2 cafeteria and training facilities and 16,400m^2 offices and laboratories. The most advanced research facilities are provided, including the following facilities:

- ULSI (ultra-large scale integration) design methodology laboratory;
- 200 mm pilot line for deep-submicron CMOS processing;
- pilot line for multi-chip modules;
- pilot line for silicon solar cells;
- microsystems laboratory;
- ultra-clean processing facility;
- research laboratories for new materials and devices;
- physico-chemical analysis laboratory;
- facility for automatic device and circuit measurements;

- packaging and testing equipment laboratory;
- equipment for device reliability studies;
- RF laboratory;
- laboratory for the development of biosensors.

Of all these infrastructure facilities, the 4,800m^2 sterile area or clean room is the pride of IMEC. The clean room is divided into two classes, class 1 and class 1000.

One of IMEC's strategic objectives is to support local industry in Flanders by joint Research and Development, by transferring its research results and by setting up spin-off companies. The initiative 'Industrialization and Incubation' has been set up to improve its interaction with SMEs (small- and medium-sized enterprises) in Flanders and to broaden the scope to non-ICT enterprises. The strategy is twofold: IMEC's technology and know-how is either used by local industry for product and process innovation or technologies are further developed to make them ready for market launch via incubation, which can result in a new spin-off company.

As the largest independent research centre in Europe, IMEC cooperates in many projects that are set up by the European Commission and European nations to strengthen the position of Europe in the area of microelectronics and ICT: IMEC participates in/co-ordinates several projects within the European Framework Programs, IMEC contributes to several MEDEA+ projects and cooperates in different European Space Agency projects.
IMEC also co-ordinates the IST project 'EUROPRACTICE IC service'. This project offers low-cost and easy access to technology of foundries without the need to commit to volume production, a major obstacle for start-up companies and companies with small niche markets. IMEC gives technical support during the design phase of the ASIC (application specific integrated circuit) up to the simulated netlist, offers a place and route service to generate the layout and prepares the tape-out for prototyping. Via a multi-project wafer (MPW) run the designs created by a variety of clients are brought together on one wafer and are jointly manufactured. IMEC also offers small-volume productions of up to a few thousand wafers per year. Finally, IMEC offers a deep-submicron layout service.

The growing market pressure for high-performance integrated circuits compels semiconductor companies to introduce new technologies faster than ever. This, together with the increasing technological challenges, requires huge investments in R&D, and consequently global collaboration between industry, independent laboratories and academia. IMEC has launched several Industrial Affiliation Programs (IIAP) in which companies from all over the world participate. These programs are based on sharing of cost, talent and risk and are built on a good intellectual property ruling. Over the past years, these IIAPs have grown into a successful form for international cooperation in research and design, next to specific bilateral collaborations.
IMEC also applauds the technological strengths of Asian semiconductor companies and believes that there are possibilities for cooperation in several fields that could be beneficial for both IMEC and Asian companies. IMEC took several initiatives to expand its R&D partnerships in Asia. Relationships are being built in china, Japan, Singapore and Taiwan.

Further References

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Flanders Interuniversity Institute for Biotechnology

Vlaams Interuniversitair Instituut voor Biotechnologie (VIB)

Organisation

The Flanders Interuniversity Institute for Biotechnology (VIB) is an entrepreneurial research institute where 750 scientists and technicians conduct gene technological research in a number of life-science domains, such as human health care and plant genetics. Through a close joint venture with four Flemish universities (the UA in Antwerp, the VUB in Brussels, the RUG in Ghent, and the K.U.Leuven in Leuven), VIB unites the forces of nine university research teams in one single institute. In the framework of this joint venture, both partners - VIB and the universities involved - invest on a long-term and equal basis in a limited number of carefully selected research departments. Both partners share the return on the investment. Combining strengths in one institute creates above all an immediate added value for the various partners and the academic, industrial, and social environments in which they work.

Policy

VIB, in cooperation with its university partners, seeks to lay the foundations for a better quality of life. In order to meet this goal, VIB develops 3 complementary core activities:

- VIB supports and further develops strategic basic research. VIB provides scientists with a stable and stimulating research environment for high quality strategic and basic research;
- VIB pursues an active patent and licensing policy. New technologies and inventions issuing from the strategic basic research are translated into industrial and social applications;
- VIB provides public information based on facts and figures to support an objective, scientifically sound public debate about biotechnology.

Activities

Centre for life science expertise With the performance of its 750 scientists and technicians, VIB has become a prominent knowledge centre in the field of life sciences in Europe. This prominence is a consequence of the substantial backbone financing allocated by the government of Flanders to VIB. This grant covers about 40% of the research cost of the VIB research departments.

VIB researchers work in a competitive international environment. The goal of VIB is to obtain breakthrough scientific innovations in the front line of specific knowledge domains in life sciences. This is only possible in a stimulating environment of rational scientific discussion and critical 'peer review'. Therefore, VIB's research is regularly submitted to a critical review by specialized and international scientific advisory boards. In this way, VIB aims at producing world-class research.

Advanced technology platform VIB's broad high-tech platform allows its researchers to tackle the challenges of the post-genome era in life science research. In 2001, VIB established its Micro Array Core Facility and prepared for the setting-up of its Proteomics Core Facility. A number of associated technologies – such as plant and mouse functional genomics, bio informatics, and three-dimensional structure analysis of proteins – were more strongly integrated into the range of VIB research activities. All these initiatives enable VIB to generate high-level, competitive research that goes far beyond the borders of Flanders.

Science with a view towards technology transfer VIB conducts a structured technology transfer program around the new inventions and technologies that result from its strategic basic research. VIB is a genuine research institute and so does not commercialize products itself. VIB is able to bring to the public the results achieved by its scientists by entering into agreements with companies that are prepared to further develop and commercialize VIB inventions. These contacts are managed by the Technology Transfer Office, which protects new findings by means of patent applications and acts as the central point for managing VIB's intellectual property rights (IPR) and interactions with the industry and investors.

VIB researchers are convinced that the technology transfer of their research results is important for society. Since VIB started its operations (1996), almost 250 inventions have been reported to the Technology Transfer Office of VIB. About 4 out of 10 of these inventions met the criteria necessary to be translated into patent applications.

In 2001, VIB filed 29 new patent applications. This is the same number as last year, the best result of new submissions since VIB was set up. VIB's patent portfolio currently comprises 94 patent families, an increase of about 20% as compared to 2000. Although some patents have already been granted to VIB, most of the filings are still in process. Nearly one third of this portfolio has reached the national phase, one third of the patent applications is running through the PCT phase, and one third is in its priority year. For the major part of the patent applications in the national phase, licenses have already been granted to industry. For the more recently registered patent applications, various licenses have already been provided and extra license holders are actively being sought. At this time, discussions are in progress with more than 60 companies. About 20% of these companies are established in Flanders. In 2001, 22 industrial R&D and license agreements were concluded. A total of 105 agreements have been concluded since VIB was established.

Newcomers One of VIB's objectives is to encourage economic growth in Flanders through technology transfer. In order to reach this goal, VIB actively combines technologies and IPR to build platforms from which new bio high-tech companies can be started up. Following a concept phase, the VIB Technology Transfer Office draws up a business plan. Subsequently, VIB looks for experienced managers to run the company, and attracts investors, either at home or abroad, interested in investing in the start-up company.

In 2001, in close collaboration with the University of Brussels (VUB) and the Investment Company for Flanders (GIMV), the biopharmaceutical company Ablynx NV was set up. Ablynx focuses on the exploitation of VIB's camel antibody technology platform. These antibodies are small, have a simple structure, and are very stable and easy to produce in large quantities. They recognize a broad spectrum of epitopes, including those that are more difficult for conventional antibodies to recognize. Ablynx will further develop the unique properties of these antibodies and market them under the form of new diagnostics, therapeutics, and applications in proteomics and affinity purifications.

Two former VIB start-ups – Devgen NV (established in 1997) and CropDesign NV (established in 1998) – have continued to grow in 2001. These two companies employ together more than 170 people.

The bio-incubator The development of new industrial activities in the biotechnology sector depends largely on the accessibility of advanced knowledge and technology, a well-trained and skilled workforce, adequate financial resources (e.g. seed money and venture capital) and appropriate infrastructure. To meet this last requirement, VIB designed and constructed a multi-tenant facility of 2,500 m2 in the heart of Flanders' Biotech Valley. This VIB bio-incubator is providing adequate laboratory and office space to R&D-driven biotechnology companies with a clear growth potential.

Given the success of the bio-incubator, VIB constructed an additional floor measuring 1,250 m2, which was available to new residents by the end of 2001. At the beginning of 2002, the VIB bio-incubator housed 7 biotechnology companies: Phase-1 BioResearch NV, Methexis Genomics NV, Algonomics NV, Devgen NV, Biotechnology Investment Partners (BIP) NV, BioMaric NV, and VIB's new start-up Ablynx NV. From this it appears that the VIB bio-incubator cleared one of the hurdles faced by new bio high-tech companies seeking to start up and blossom in Flanders.

Well-considered and objective communication In Europe, there is regular debate over the various aspects of biotechnology. Very often, however, discussions take place in a polemic of 'for' and 'against'. Much more preferable are discussions which deal with objective, scientifically based information, facts and figures. The scientific community has an important role to play and should assume responsibility in this respect. VIB has therefore set up a communication program, which is keen to inform the public in Flanders in an objective way of the benefits and concerns of agricultural and medical biotechnology. In doing so, VIB is hoping to make a constructive contribution to an objective and scientifically-based public debate on biotechnology.

More and more, students, teachers, interested and worried consumers, the press, politicians, and other interested parties are contacting VIB for information. On average, VIB receives 30 requests for information per week. VIB publications and multimedia applications are requested in great numbers, and specific questions are dealt with

in a thorough and personal way. VIB has prepared a number of brochures informing the public about the basics of gene technology, its medical and agricultural applications, and genetic disorders. VIB has also published a book on medical and diagnostic applications of biotechnology. The book particularly focuses on current (e.g. protein drug) and future (e.g. gene therapy, cell therapy) applications, as well as on societal issues raised by these biotechnological applications. Almost on a weekly basis, the VIB communications division organises or takes part in lectures and hearings on biotechnology for the public at large. In this way, scientists literally step out of their ivory towers to explain their work - and gene technology in general - to broad segments of the Flemish population.

Acquiring objective information The safety of genetically engineered crops is an important topic of public debate. To contribute to the international scientific discussion, VIB brought together the most recent facts and figures on this issue with the aid of 5 panels of prominent scientific experts. All the data were collected in the VIB report 'Safety of genetically engineered crops', which was published in June 2001.

In the beginning of 1999, VIB initiated seven Technology Assessment projects, attempting to provide answers to a number of relevant public questions about gene technology, such as: 'What do people think about predictive genetic tests for late-onset diseases?' and 'What are the economic costs and benefits of biotechnological applications in agriculture?' This independent scientific research is under the autonomous supervision of the relevant specialists in the field. The research program contributes to the development of special expertise in Flanders in the area of public questions regarding biotechnology.

The projects deal with topics for which no - or insufficient - information is available today, and which will become important in the future. Thus, the program has the lead on the public debate of tomorrow.

The results of these projects will be made available to the public. VIB will use the results of the Technology Assessment research program in its public information program and will give feedback to the relevant target groups within and outside Flanders.

Further References

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Flemish Institute for Technological Research

Vlaamse Instelling voor Technologisch Onderzoek (Vito)

Organisation
An independent research centre founded in 1991, the Flemish Institute for Technological Research (Vito) is the largest and best-equipped research centre in Belgium in the fields of energy, the environment and advanced materials. At present Vito has 460 highly skilled employees (over 50 % graduates, engineers and PhDs), who dispose of state-of-the-art laboratories. In 2001 Vito's generated income rose by 1.34 million euro to 19.04 million euro, representing an increase of 8% over 2000.

Policy
Distribution of knowledge remains one of Vito's main policy tasks. Therefore Vito aims at maintaining its position as a major centre of knowledge for Flanders through the high quality of its strategic scientific research and its innovative character. By means of patents and joint ventures with companies Vito broadens the application of technology. Vito also has an economic impact in Flanders and aims to increase external income from industrial projects.

Activities
Vito carries out market-oriented technological research, develops innovative products and processes and provides companies and governmental organisations with solutions and advice that are in full accord with both economic and social responsibilities. In each of Vito's *centres of expertise*, the client will find dedicated specialists with the technological experience to develop state-of-the-art, feasible and individual solutions.

Environmental measurements
- measurement and analysis of environmental pollution: development of specialised analysis and measurement techniques and realisation of integrated and complex expertise such as dioxin measurements in smoke gases and environmental air, sampling and analysis of workplace atmosphere, measuring aerosols, smell analyses,...;
- Flemish reference laboratory for all environmental analyses;
- structural scientific partner of the Flemish environmental administrations, e.g. for the scientific foundation of the technical rules for waste, soil and air;
- within Flanders Vito is the lead for European programmes concerning the normalisation of environmental analysis methods.

Remote sensing and atmospheric processes
- long-lasting and internationally recognised contributions towards the modelling of terrestrial and atmospheric processes. Vito develops models for the evaluation of air quality in the complex structure of a city, within a region, at national or European level, and for the evaluation of productivity of natural vegetation and cultivated crops;
- use of terrestrial observation for monitoring of the environment;
- Vito based centre for image processing and archiving of the VEGETATION instrument aboard the SPOT 4 satellite.

Environmental toxicology
- investigation of the risks of chemical products and environmental pollution for man (toxicology), plants and animals (ecotoxicology);
- based on the latest molecular and technological developments, including in-vitro technology;
- also including standard tests carried out under strict quality conditions (Good laboratory practices or GLP). The quality manager makes sure that organisation and infrastructure comply with the strict quality requirements at all times.

Integral environmental study
- the Flemish reference centre for environment oriented product development (ecodesign) and integrated chain management, best available techniques and cleaner production;
- support in energy and environmental policy with respect to air, water and soil pollution and waste treatment;
- the Flanders platform for the electronic dissemination of energy and environmental information.

Materials technology
- introduction and implementation of innovative materials and related processing technologies in industry - prolonging service life, improving quality and developing innovative products and processes are the basic objectives here;
- surface technology, laser applications, ceramic materials and powder metallurgy are at the core of the know-how in this centre. Excellent analysis and test facilities support the research and are also made available to industry;
- in all activities the centre pursues the goal of sustainable technological development at the European level.

Process technology
- introducing cleaner technology in industrial processes by developing and applying membrane technology and supercritical fluid reactor technology;
- water pinch studies for industry, both for the purpose of saving water as well as for closing water loops.

Energy technology
- to support industry and public services in their search for rational use of energy, optimal use of available and renewable energy sources and reducing CO_2-emissions;
- renewable energy sources, decentralised energy systems, fuel cells, and the underground as a resource or reservoir for energy, CO_2-storage in the underground, new vehicle technologies and electric systems.

Environmental technology
- development and valorisation of new industrial technologies for (effluent) water treatment and decontaminating polluted soils and sludge;
- objective consultancy in the introduction of environmentally friendly production and management techniques and for solving environmental problems;
- research activities are concentrated on water and soil;
- provision of practical service covers water, soil, waste and air, and is carried out by PRODEM;
- in both its R&D work and its contract research, the centre is endeavouring to react in a pro-active way to the European Water Directive (2000/60/EU), which obliges states to increase their efforts to improve the quality of water in the river basins of the European Union.

Further References

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Prince Leopold Institute of Tropical Medicine Antwerp (ITMA)

Prins Leopold Instituut voor Tropische Geneeskunde Antwerpen (ITG)

Organisation

The Prince Leopold Institute of Tropical Medicine (ITMA), based in Antwerp, is one of the world's leading institutes for training, research and assistance in tropical (human and veterinary) medicine and health care in developing countries. The ITMA's basic mission is to strengthen the rational basis of health care in developing countries, and to provide clinical services for tropical diseases in Belgium. Formally the ITMA is an independent centre for specialised academic research and training, recognised and funded by the Education Department of the Ministry of Flanders. It has a Board of Governors in which all universities and authorities concerned are represented. The ITMA closely collaborates with the Belgian Agency for Development Co-operation (BADC) and many other national and international organisations.

The scientific activities take place in five departments: Parasitology, Microbiology, Clinical Sciences Public Health and Veterinary Medicine. They are supported by well-equipped scientific, technical and administrative central facilities, including a specialised library.

ITMA runs an outpatient clinic for tropical and travel medicine, a reference clinic for HIV/AIDS patients, a specialised medical laboratory, and the tropical medicine ward in the Antwerp University Hospital. It has a staff of 300 and an annual turnover of 27 million euro.

Policy

The key activities of ITMA are:

- provision of outpatient, clinical and preventive services in tropical (veterinary) medicine and related pathology;
- education in tropical (veterinary) medicine and the organisation of health care in developing countries;
- research on the biomedical, clinical and operational aspects of tropical diseases and their control, and the organisation of health care in developing countries;
- advising and strengthening governments, organisations and institutions in developing countries, Belgium and internationally, which are involved in human and animal health care in developing countries.

In all its activities, ITMA adheres to the principles of:

- specificity and complementarity with universities and development organisations;
- quality and efficiency of the highest international standards;
- ultimate relevance to international rights based health development;
- integrity as a "school of thought" on integrated rights-based health care;
- institutional and field links;
- equal collaboration with partners in the South and North.

Activities

Training ITMA is continuously hosting hundreds of students and trainees from all over the world. To date, over 17,000 physicians, nurses, biologists, veterinarians, agronomists and technicians have obtained ITMA's diploma in tropical medicine or animal health. Over 1,500 international students have been trained to the masters and doctoral level. Training is offered at four levels:

- short course and trainee ships on various specialised subjects;
- diploma courses for medical, paramedical, veterinary and agricultural professionals wishing to practice in tropical and developing countries (5 to 12 months, Dutch and French);
- international Master Degree Courses for scientists and professionals working in tropical and developing countries: Master in Public Health, Master of Science in Disease Control, Master of Science in Tropical Animal Production or Health (10 to 12 months, yearly alternating in English or French);
- PhD: doctoral research and training in collaboration with universities;
- a good number of fellowships are available from the Belgian Ministry of International Co-operation and from other institutional and external sources.

Research ITMA's research includes clinical or epidemiological work, applied or fundamental laboratory research, and health systems research. It takes place in the field as well as at ITMA, and is conducted in partnership with institutes or agencies in the developing countries and other international partners. ITMA participates, often as co-ordinator, in many international networks, and is a WHO reference centre in various fields. The main research programmes focus on:

- major tropical diseases: malaria, sleeping sickness, leishmaniasis, schistosomiasis;
- AIDS, tuberculosis and other mycobacteria and sexually transmitted diseases;
- the organisation and management of health services in developing countries;
- trypanosomiasis, theileriosis and cysticercosis in cattle.

Services ITMA provides specialised curative and preventive health care to over 12,000 patients per year. It is a national and international reference centre for the diagnosis of tropical and parasitic diseases, AIDS and TBC. ITMA provides consultancies, advisory work and capacity strengthening in its fields of expertise to major international and to ministries, agencies, organisations and institutions all over the world. In collaboration with the Belgian Agency for International Co-operation it runs an extensive collaborative programme with partner institutes in the South.

Further References

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Population and Family Study Centre

Centrum voor Bevolkings- en Gezinsstudie (CBGS)

Organisation
The Population and Family Study Centre (CBGS) is a scientific research institute in Flanders. It emerged from the former bilingual national centre created in 1962. Its functions are defined as carrying out problem-focused research relating to population and the family, contributing to the development of governmental policy in these areas and informing the public on population and family problems. The Minister of the Government of Flanders for Welfare, Health and Equal Opportunities is responsible for the CBGS.

The CBGS has two scientific sections: Social Demography and Family Formation, Family and Welfare. Its present work force is composed of 17 researchers and 9 supporting staff members.

Policy
The CBGS has quite a broad research programme, covering the major fields of societal and policy relevant family and population phenomena. It regularly undertakes sample surveys on current family and population issues, but also analyses other demographic and social data sources such as census data and vital statistics.

Activities
Currently its major research projects concern the following issues:
- demographic trends, prospects and policy;
- relational and reproductive behaviour;
- parenthood and living conditions of children;
- population ageing and the aged;
- family life and other lifestyle options;
- welfare of problem families;
- impact of policies on the family;
- world population and development.

The CBGS publishes the results of its scientific investigations in several publication series, most of which are in Dutch, but some are produced, in cooperation with other institutions, in English:
- Bevolking en Gezin;
- CBGS publicaties;
- CBGS werkdocumenten;
- NIDI/CBGS publications.

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Institute for Forestry and Game Management

Instituut voor Bosbouw en Wildbeheer (IBW)

Organisation
The Institute for Forestry and Game Management (IBW) is a research institute of the Flemish Community and was founded in 1991. It incorporates the former Government Poplar Research Institute (Geraardsbergen) and the Government Research Station for Sylvicultural an Hydrobiogical Research (Groenendaal). The institute consist two divisions: a forestry division and a game management division. The last one conducts research on game management and management of expansive or exotic mammals and on inland fishstock management.

Policy
The general mission of IBW is to conduct scientific research, policy oriented research and to provide scientific services to forestry, inland fisheries and game management. This research is strengthened through networking with regional, national and international research institutions and organisations.

Activities
Forestry Division Forest and forestry research focuses on the following topics:

- forest ecology, forest development: methodological and ecological research in forest reserves, monitoring of natural processes in strict forest reserves, sylvicultural research focusing on natural regeneration and transformation of homogeneous and even-aged stands, biodiversity in forests;
- conservation and use of forest genetic resources: conservation of genetic resources, study of the genetic diversity, selection and breeding of high value forest reproductive material, phyto-pathological assistance of the selection and breeding programmes, molecular genetics in relation to breeding and conservation of genetic diversity;
- site research: research on site-classification related to tree species and forest types, soil restoration, establishment techniques for afforestation and reforestation, geo-chemical and hydrological cycling, socio-economical aspects of afforestation on agricultural land, sanitation of polluted dredge disposals;
- forest protection: monitoring of forest health condition, study of biotic and abiotic stresses, influence of long range transboundary air pollution on forest ecosystems, intensive monitoring of air pollution, with focus on ammonia, in forest ecosystems, diagnosis of biotic damage on trees;
- wood technology and wood quality: evaluation of wood quality of selected forest reproductive material, heritability of wood properties, use of wood products under a changing forest policy, determination of wood chains.

The forestry division has a strong reputation in poplar breeding, it organises also the Forest Soil Co-ordination Centre of the International cooperative programme on forests of the UN, with support of the E.U.

Game Management Division The main activities of this division are related to inland fisheries and game in a broad sense.

Inland fisheries:

- monitoring of fish stocks in Flanders in order to evaluate their distribution and vitality and to monitor watercourse quality in the context of the E.U. frame directive 'Water' using an index of biotic integrity (IBI);
- evaluate the presence of heavy metals, PCB's and other pollutants in fish for risk assessment for consumption;
- pisciculture: research into breeding and re-introduction of endangered and/or ecological important fish species;
- fish stock planning and management: amelioration of the structural quality of the aquatic biotope, evaluation of the effectiveness of ecological engineering, restoration of fish stocks;
- methodological research to improve fish migration in Flanders. Data on bottlenecks and solutions are made available in an interactive way on the internet for the water managers[1].

1 www.vismigratie.be

Game management and hunting:

- monitoring of the native mustelids and research on their population dynamics in relation to habitat quality;
- the position and population ecology of the Fox in Flanders, including the presence of fox tape worm;
- standardisation of the game management plans in Flanders, including standardisation of game inventories and shooting statistics;
- development of strategies to prevent damage of expansive and harmful species, as well as exotic invasive species (rats, Muskrat and Coypu).

Also the division Game Management is involved in European research projects.

Facilities The institute has at its disposal nurseries, seed orchards, greenhouses, laboratories for soil and foliar analysis, for pathological and molecular analysis, in vitro propagation facilities, a measuring tower for monitoring of air pollution in forest, a fish breeding centre, a zoological lab, GIS and dGPS facilities,...
The research results are disseminated through publications in national and international journals, seminars and meetings, study tours,... but also through own channels: scientific reports, an annual activity report, a newsletter and the website.

Research team The research staff consists of 48 researchers, technically assisted by another 50 persons.

Further References

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Institute of Nature Conservation

Instituut voor Natuurbehoud (IN)

Organisation

The Institute of Nature Conservation (IN) was founded in 1986 as a scientific institute of the Flemish Community. Starting with a group of six biologists, the number of employees soon grew to well over a hundred people with multi-disciplinary backgrounds and interests. A key task is the systematic collection and processing of information on biodiversity and the state of nature in Flanders. Much attention is paid to monitoring and long-term, interdisciplinary research on flora, fauna and living communities and the environment. This knowledge is then translated into policy making tools, such as 'Red Lists' of threatened plant and animal species and the Biological Valuation Map of Flanders.

Policy

Most of the research at IN is focused on the development of policy instruments. Three research levels have been recognised (species/population, community/ecotope, ecosystem/landscape), each of which can provide an input for tasks directly aimed at the preparation, support and evaluation of policy. For the practical organisation of its activities, the Institute is structured into six research units:

- population and distribution ecology;
- ecotope typology and biological evaluation map;
- ecohydrology and water systems;
- landscape ecology and nature management;
- nature development and policy;
- nature report.

Activities

As a centre of information and knowledge IN contributes significantly to the collection and interpretation of field observations on the effect of environmental policy making. A maximal degree of openness is the house rule. Databases and research results are made generally available, not in the least by our website. This transparancy is also reflected in the multitude of joint projects with volunteers, associations, universities and other scientific institutes in Belgium and abroad. Obviously there is a close cooperation with various Flemish government departments and public bodies. Research can be commissioned by third parties if it ties in with the programme and areas of expertise of IN. The knowledge and experience of the Institute contributes not only to science per se, but is also actively put at the disposal of society. The government is informed and advised through close and frequent contacts with ministries and administrative departments, steering committees, and advisory committees, as well as professional and voluntary nature conservationists.

IN considers it important to present this data and research results in an understandable format and to make the information widely available. Both the original scientific contributions and their translation for the policy-makers and nature conservation managers is made available through a range of publications, such as the Communications of the Institute of Nature Conservation, IN Reports Series A and Series B, the Annual Activity Reports, Biological Valuation Maps, the Nature-CD, the Nature Report, and the website. A more specialised scientific audience is reached through publishing in national and international scientific journals. In addition, the Institute organises seminars and conferences which ensure a targetted distribution of the research results.

An important task of the Institute is the biennial compilation of the Flemish Nature Report, which describes the state of nature in Flanders and evaluates the recent environmental policy. The report deals with the impact of various disturbances on nature (dehydration, fragmentation, excessive use of fertilisers and acidification). In addition to an evaluation of the existing conservation policies and protective measures, expected future trends and scenarios are covered. The Nature Report was first published in 1999.

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Institute for the Archaeological Heritage

Instituut voor het Archeologisch Patrimonium (IAP)

Organisation

The Institute for the Archaeological Heritage (IAP) has been established by the 'Besluit van de Vlaamse Regering' of June 5, 1991 as an official Flemish applied research institute. It is linked to the Department of Environment and Infrastructure (Town and Country Planning and Housing Administration) of the Ministry of Flanders.

Policy

The Institute is mainly assigned to prepare and execute the policy concerning the management and protection of the archaeological heritage in Flanders and to perform scientific research and studies on this subject. It carries out the officially adopted policies through inspection of endangered or newly-discovered archaeological sites, in consultation with regional and local planning authorities and the Flemish Administration for Landscapes and Monuments. IAP also maintains regional offices throughout Flanders that are responsible for performing excavations and undertaking specialized research and scientific studies on archaeological material. These tasks relating to the care and protection of archaeological monuments have been consolidated by the 'Decree for the Protection of the Archaeological Heritage' of June 30, 1993. IAP has been charged with the implementation of this legislation. Furthermore, the responsible Minister can commission the Institute to undertake scientific research, or provide information, guidance or counselling in matters concerning the archaeological heritage on behalf of public organisations and legal persons.

Activities

- collecting all relevant data concerning archaeological excavations, finds and sites in Flanders and collecting and organizing this data in a systematic inventory of the Flemish archaeological heritage, the so-called 'Central Archaeological Archive';
- compiling a thorough inventory, description and mapping of archaeological sites;
- maintaining and updating a list of archaeological sites and zones that qualify for specific protection measures and managing such files;
- utilising all legal and administrative means in order to ensure the protection, the preservation and the management of the archaeological heritage;
- conducting scientific research on the archaeological heritage of the Flemish Community, including excavations, within the framework of long-range research projects or through 'rescue excavations' at sites in immediate danger of destruction;
- ensuring the timely and thorough execution of rescue excavations and interventions in threatened archaeological zones and to help coordinate these excavations;
- providing scientific, technological, and/or material support to institutes, associations or persons officially authorised to perform archaeological excavations;
- ensuring the conservation and restoration of moveable archaeological objects;
- formulating recommendations to the responsible Minister concerning the preservation of archaeological findings in proper depositories, in acknowledged museums or possibly in the Institute's own archives;
- formulating recommendations on the protection and management of the archaeological heritage, on the organisation of archaeological research, on the professional criteria for receiving authorization to conduct archaeological excavations, and on the collaboration of institutes, associations or persons performing archaeological excavations or who have been authorised to do;
- increasing public awareness of and interest in the protection of the archaeological heritage by means of exhibitions, special events, and educational programs;
- publishing on a regular basis scientific and popular publications concerning the results of archaeological research and other studies regarding the archaeological patrimony - in order to communicate the current understanding of the archaeological heritage of Flanders to academic institutions and to the general public;
- offering advice on the protection and management of the archaeological heritage, the organisation of archaeological research and the collaboration of institutes, associations or persons performing archaeological excavations or authorised to do sol;
- stimulating acknowledgement and protection of the archaeological heritage by means of exhibitions and instructional and informative attitude towards the public in general and education in particular.

Further References

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Royal Museum of Fine Arts Antwerp

Koninklijk Museum voor Schone Kunsten Antwerpen (KMSKA)

KONINKLIJK
MUSEUM VOOR
SCHONE KUNSTEN
ANTWERPEN

Organisation

The Royal Museum of Fine Arts in Antwerp (KMSKA) is one of the five scientific institutions of the Flemish Community. It is the largest museum in Flanders. It also possesses one of the most important collections of Flemish art in the world: paintings, sculptures, drawings and graphics from the 14th until the 20th century (a.o.: unique Early Netherlandish panels, the largest collection of 16th and 17th century altarpieces by Antwerp painters such as Rubens, Van Dyck and Jordaens, and the largest collection of paintings and drawings by James Ensor).
In the 19th century the collection was part of the Antwerp Royal Academy of Fine Arts, in 1890 it became a separate museum and was housed in a neo-classical building of its own. In 1965 it became a scientific institution. KMSKA is also one of the most popular art historical and cultural institutions in Flanders and Belgium, greeting en average of 500 visitors every day.

Policy

The policy of the KMSKA is to give access to a collection of art works representative for the history of art in Europe, especially Flanders, and to open up a body of relevant learning to a large and divers audience.

Activities

Scientific activities include the following:

- art historical research: stilistic, iconographical, biographical and socio-cultural investigations into Flemish art of the 15th to the 20th century, in view of opening up the museum collections, problems of attribution and interpretation, and the acquisition politics of the museum;
- museological research includes problems of presentation and display, educational methods, cultural and social behaviour, communication in the cultural field and related topics;
- technical investigations in view of problems of preservation, conservation, restoration and art technical matters. Research projects focused on problems in panel painting, Early Netherlandish diptychs are in the coarse of development.

The scientific potential consists of 18 staff members organised in 3 departments assisted by operational management services (guards, technicians, administrators):

- Department of Research;
- Department of Collection Management;
- Department of Communication, Education and Exhibitions.

Thanks to its research, scientific publications and exhibitions the KMSKA maintains close contacts with museums and art historical research institutions, as well as universities all over the world. Frequent requests (for loans from the collection for exhibitions by museums in Belgium and abroad) show that the importance of its collection and name are generally acknowledged. Staff members regularly participate in the organisation of exhibitions, colloquia and publications or research programs set up by European or American museums or institutions.

The museum publishes the 'Antwerp Royal Museum Annual' which is one of the leading periodicals devoted to Flemish art. Furthermore the museum publishes catalogues and studies. The public has access to the collections in the museum galleries (facilities such as bookshop or museum café included). The library, the archives and documentation centre, the museum stores or the graphic room can be consulted by appointment. A whole range of educational media is at the disposal of the museum visitor (audio tour, leaflets, Internet access, guided tours, and so on).

Further References
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Agricultural Research Centre

Centrum voor Landbouwkundig Onderzoek-Gent (CLO – Gent)

Organisation

The Agricultural Research Centre (CLO - Gent) is a multidisciplinary research institute made up of seven departments. Founded more than 50 years ago by the Belgian Ministry of Agriculture it became a Scientific Institute of the Flemish Community on 1 January 2002. All research activities are mainly oriented towards developing sustainable agricultural and fishery systems and controlling the quality and safety of agricultural and food products. In this context CLO fulfils a pioneering role in support of a pro-active agricultural policy and to do so, is relying on some 130 researchers.

Policy

The Centre's policy is to support the mission of the Ministry of Agriculture in order to install sustainable development in the economic sectors that are of its concern:

- basic and applied research and development;
- monitoring information and documentation;
- various services and exchange of expertise.

More specifically it is directed towards the requirements of animal husbandry and feed production, animal welfare, food quality and food safety, sea-fisheries and horticulture, in particular ornamental cultivation.

Activities

The Department of Plant Genetics and Breeding (DVP) aims at developing sustainable cultivars of grasses, forage crops and certain outdoor vegetables and ornamentals. DVP also carries out research into the genetic backgrounds and regulation of disease resistance (rust in ryegrass and leek, mildew and black spot in roses), sport formation (azalea); self-incompatibility (ryegrass and chicory), apomixis and nitrogen efficiency (ryegrass) which should offer new perspectives in plant breeding. In function of variety protection, consumer protection and implementation of EU regulations DVP is developing tools for authenticity testing of plants and plant derived products.

The Department of Crop Husbandry and Ecophysiology (DFE) conducts scientific research on the behaviour of grass, fodder crops and ornamental plants under different growth conditions. The aim is to improve yield and quality as part of a sustainable agriculture with respect for man, animal and environment. In relation to the production of arable and forage crops, attention is paid to organic farming methods and crop rotation. The registration of mineral balance sheets, the reduction of mineral surpluses and losses, the limitation of nitrate residues, post-harvest and after the grazing season, and the feeding value of grass in relation to fertilisation and growth stage of the plant are examined. Testing the value of new varieties of agricultural crops and ornamental plants remains an important task.

Researchers at the Department of Crop Protection (DGB) study different aspects of the problems caused by harmful organisms to plants in agriculture and horticulture. Their research can be divided into three areas: (i) research on the identification and detection of harmful organisms, (ii) study of their ecology pathogenesis, and (iii) the development of integrated management systems. Each of these research areas contributes to the reduction of the impact of the pathogen to an acceptable minimum and to the development of a sustainable agriculture.

The Department of Animal Nutrition and Husbandry (DVV) performs scientific research focused on the nutrition of different farm animals. This implies an up-to-date knowledge of specific requirements. On the other hand, the nutritional value of the available feedstuffs has to be predicted as accurately as possible. Moreover, it may be useful to increase the feeding value by technological treatments. Apart from feeding topics, the study of the production techniques is also an important research item.

The mission of the Department of Animal Product Quality and Transformation Technology (DVK-CLO) is to carry out research to improve the safety and the quality of animal food products in order to protect the consumer and to safeguard the market position of food produced according to sustainable production and transformation technologies. The main research topics are microbiological and chemical food safety, authenticity and composition-related food quality. DVK-CLO focuses on applied fundamental research about dairy products, poultry, eggs and pigs to support the governmental policy, but is also involved in services. DVK-CLO has several accredited laboratories and possesses pilot installations for technological testing.

The assignment of the Department of Mechanisation, Labour, Buildings, Animal Welfare and Environmental Protection (DVL) is to carry out scientific work in connection with the following items: application of engineering techniques in and around farm buildings, labour organisation in agriculture and horticulture in general, field mechanisation, animal welfare and environmental protection. A major part of the activities of the department consists of service to the public and includes the mandatory governmental inspection of spraying machines.

The mission of the Sea Fisheries Department (DVZ) comprises the building of a scientific basis for the rational and sustainable exploitation of the marine environment from the biological as well as technical and socio-economic point of view. In addition, its research is oriented towards the protection of the marine environment as a habitat and towards the quality control and guarantee of sea fisheries products.

Further References

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Limburg University Centre
Limburgs Universitair Centrum (LUC) 53

University of Antwerp
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Ghent University
Universiteit Gent (RUG) 59

Brussels' Free University
Vrije Universiteit Brussel (VUB) 62

Catholic University of Brussels

Katholieke Universiteit Brussel (K.U. Brussel)

Organisation

The specific nature of research at the Catholic University of Brussels (K.U. Brussel) is of course influenced by the small scale of the university and the fact that its teaching qualification is limited to the following four faculties of Human Sciences, namely:

- Faculty of Law;
- Faculty of Arts;
- Faculty of Economics and Applied Economics;
- Faculty of Political and Social Sciences.

Moreover, teaching is confined to undergraduate levels and postgraduate studies. At this writing (27th June 2002), the number of research staff amounts to a total of 90 professors (including visiting lecturers), 33 assistants and 3 researchers with a fellowship.

Research Policy

In a university emphasising undergraduate education, didactic significance is sometimes decisive in the selection of research topics. The research activities at the K.U. Brussel are remarkably dynamic and diverse. This applies to the large-scale and long-term research activities of the three Centres of Excellence and of the numerous other Research Centres as well as to the small scale research projects of individual members of the independent academic staff.

The research of the K.U. Brussel is financed to an increasing extent by external resources granted mainly by one or several of the following actors: the Flemish government, the federal government, private companies, European and international organisations.

Research Activities

The K.U. Brussel's three so-called Centres of Excellence are:

- the Research Centre on Multilingualism which concentrates on a further development and broadening of the range of application of contactlinguistic methodology by focussing on the revitalisation of language and culture of minority speech communities;
- the Research Centre on Legal Theory which studies the possibilities of using analyses of legal concepts and legal relations in comparative law; these research projects are linked to the successful advanced academic training programme on legal theory;
- the Research Centre on Entrepreneurship (a joint research centre for K.U. Brussel and Ehsal) which examines all possible aspects of the entrepreneurship in small, medium as well as large enterprises.

Three other large scale initiatives are related to:

- the Research and Editing of the Collected Works of J.L. Vives: several works of the humanist Vives are already edited and translated among which the first, second and third book of 'De Institutione Feminae Christianae'; a new edition of Vives' work is planned for the end of 2002: J.L. Vives' 'De subventione pauperum';
- the History of Middle Dutch Epic Poetry: an entirely new history of Middle Dutch epic literature will be realised in which more attention will be paid to the cultural context of epic literature, the manuscriptal dimension of these texts, the French literature in the Low Countries and the primary and secundary reception of epic texts;
- the Applied Social Statistics: two main domains of research are the adequacy and interpretation of models for ordinal association, and the different methods of working with missing data (with application on the paneldata of the elections in 1991,1995 and 1999).

An impressive number of small scale research projects in all the disciplines covered by the different departments at the K.U. Brussel have to be mentioned. The following survey is representative, but not exhaustive:

- the Faculty of Arts realises research projects on: 'Dutch, English, German respectively European literature', 'A critical reading of Thomas Carlyle', 'Pedagogical grammar of Dutch', 'History of middle-Dutch epic literature', 'Contact linguistics', 'Pragmatics of ideology in Taiwanese news reports in English', 'A syntactic atlas of the Dutch dialects', 'Monetary production and circulation in the Netherlands in the 16th - 19th century', 'Contemporary Belgian political history', 'History of criminal law in Belgium and the Netherlands', 'History of the Greek-Roman antiquity', 'Political philosophy', 'Philosophy of Hume, Nietzsche, Wittgenstein and other contemporary philosophers',...;
- in the Faculty of Law research is realised on topics as: 'Copyright and intellectual property', 'Juridical analysis of conflicts', 'Juridical theory of contracts', 'European civil code', 'Sureties and warranties', 'General principles of law', 'Theory of comparative law', 'Theory of legislation and democracy', 'Renovation and innovation of the democracy', 'Developments in Russian law', 'Légalité des actes du magistrat dans l'administration de la justice criminelle en République Démocratique du Congo',...;
- the Faculty of Economics and Applied Economics provides research on: 'Support services for micro, small and sole proprietor's businesses', 'Participative urban planning for the Brussels-Capital Region', 'European observatory for SME's', 'Value conflicts within the management of SME's', 'Recognition and 3-dimensional reconstruction of digital color images', 'Computer models and software to visualise mathematical objects', 'Employees' participation to profits in the EU', 'General accountancy', 'Cost-benefit analysis', 'Environmental policy', 'New technologies in education',...;
- the Faculty of Political and Social Sciences provides research on: 'International peace intervention', 'Motivation and fear of failure among the executive staff in private companies', 'Factors promoting succes in higher education' ,'Evaluation of the education campains of the NGO's', 'Communication and development', 'The socio-cultural consequences of the European information society', 'Methodology of social statistics', 'Analysis of electoral results (national election studies)', 'Longitudinal analysis of cultural values in Flanders', 'The effect of the electoral system on the party system', 'Social cohesion: agenda setting', 'Research on ethnic minorities', 'Multicultural policy in Brussels', 'Interdisciplinarity', 'The oeuvre of Pierre Bourdieu', 'The influence of American pragmatism in philosophy on contemporary theory', 'Encyclopaedia of social science research methods',...

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Website: http://www.kubrussel.ac.be

Catholic University of Leuven

Katholieke Universiteit Leuven (K.U.Leuven)

Organisation

Founded in 1425, the Catholic University of Leuven (K.U.Leuven) is the oldest university in the Low Countries, and in the 16th century it was one of the most prominent intellectual centres of the Western world, harbouring famous scientists and humanists such as Erasmus, Vives, Vesalius, Dodoens, Mercator and many more. The Flemish-speaking and French-speaking sections that had gradually emerged in the 20th century became separate daughters by the 1970s.

Today, K.U.Leuven is a centre of learning, originating in the symbiosis of teaching and research, young promising scholars and senior academics, intellectual resources and opportunities, etc. Within this university environment, the interplay between teaching and research is the core mission of the organisation: teaching is research-based and research benefits from the continual throughput of well trained, talented scholars.

In its educational mission, the K.U.Leuven, with its 1800 academics (PhD-level), transfers knowledge through high-quality interdisciplinary teaching and university education to more than 27,000 students in an intellectually stimulating, socially supportive and student-centred environment. The teaching offered encompasses virtually all disciplines in the humanities, in science and technology, in bio-science and medicine, and is continuously directed toward new target groups.

Education at K.U.Leuven is strongly based on research, with special attention focused on the training of young researchers from this country and from abroad. K.U.Leuven is an important point of attraction for young researchers. Approximately 300 PhD degrees are granted each year.

The research carried out at K.U.Leuven is primarily fundamental, but there is also an emphasis on the relevance of scientific progress to global society. This multidisciplinary approach assigns an added value to scientific efforts and creates an environment in which science meets culture and culture meets science. Furthermore, society's expectations of science are still increasing and many analyses predict that our future can only be prosperous if it continues to be based on science. One of the challenges facing K.U. Leuven is to play a leading role within this balance between centre of knowledge, on the one hand, and contributing to social, cultural and economic development, on the other.

Research Policy

Never before has Europeanisation had such drastic consequences for university policy, both in teaching and research. Faced with these new challenges, K.U.Leuven is now actively contributing to the realisation of the European higher education space (Bologna declaration, 1999). To this end, it will design and implement its curricula within the boundaries of this new framework, an operation which will be finished by 2009-2010.
From a research point of view, K.U.Leuven has always maintained very active partnerships in the European Networks for Research. Approximately 10% (12 million euro) of our research funding originates from European research programmes. K.U.Leuven has the ambition to maintain and even to improve this position in the newly proposed concept of Framework Programme VI, with its Networks of Excellence and its Integrated Projects. The main strategy to realise this objective is to encourage a 'culture of quality assessment', since quality is the ultimate and, over the long term, the only means to achieve a strong position at international level.
Quality assessment has always been an integral part of academic research: researchers are continually addressing 'quality questions' such as: 'Is my approach sound?', 'Is my methodology efficient?', 'Is my hypothesis sufficiently tested?', 'What about my future research strategies?', etc.

At K.U.Leuven, there are at least three good reasons for putting quality assessment at the forefront of each academic research policy:

- accountability: the accountability to the global community has become a crucial item, not least because of the relative estrangement of many citizens from science and technology. Therefore, 'output monitoring' (i.e., measurement of publication output, their 'citations and impact', number of PhD students, etc.) is seen as one of the most important tools in the assessment of research at K.U.Leuven;
- international level: competition between scientists has increased considerably during the last decade, as has the impact of their work on both global society and the world economy. As a consequence, meeting the international quality averages has to be a strategic priority for each academic researcher. At K.U.Leuven, benchmarking towards international quality standards is intended to be a powerful tool to improve the quality of our research;
- knowledge transfer from research to education: 'Quality' has traditionally been related to the significance and originality of research. At the same time, original and advanced research is supposed to improve the training process. At K.U.Leuven, the move to broaden the efforts for PhD students has placed renewed emphasis on the importance of specific research training in PhD programmes.

The efforts undertaken in quality assessment have already demonstrated their effectiveness. In benchmarking exercises in the framework of the European Commission's 'Science and Technology Indicators', K.U.Leuven was ranked among the top 10 European universities. This ranking was based on publication output and citation rate.

Research Activities

With more than 3000 researchers, senior academics as well as PhD students and young postdoctoral researchers, K.U.Leuven covers all of the traditional academic domains in humanities, medical sciences and exact sciences. From a management point of view, it is a real challenge to promote research initiatives in all these domains in a balanced way, and to offer (financial) opportunities to the research units to elaborate their ideas. Therefore, K.U.Leuven has at its disposal a dedicated research management structure, consisting of 4 cornerstones: the Research Policy Council, the Research Council, the Research Co-ordination Office and the university/industry interface 'K.U.Leuven Research and Development' (LR&D).

The Research Policy Council deals with general management issues, whereas the Research Council is charged with the assessment of research proposals from K.U.Leuven researchers who apply for funding by the University Research Fund, which has an annual budget of approximately 40 million euro.

The Research Co-ordination Office is charged with the day-to-day management of the activities of the Research Council, as well as with providing information and encouraging all other opportunities for research funding.

The fourth cornerstone is LR&D, in charge of industrial research projects and related issues, such as intellectual property rights, patenting, licensing, royalties, etc.

These research management activities strongly contribute to the success of research at K.U.Leuven. Our university encompasses a considerable number of excellent research groups which are internationally recognized leaders in fields such as cardiovascular research, human genetics, signal processing, materials research, archaeology, nanotechnology, yeast and plant research, virology, experimental psychology, theology, governance and many others.

Many of these research groups are now preparing participation's in European Networks of Excellence and Integrated Projects and - perhaps more importantly - attain or consolidate positions at the forefront of their domains.

Technology Transfer
The activities of K.U.Leuven Research & Development include:

- contract research: professional advice is provided both to determine opportunities (innovation advice & technology brokerage) and to negotiate and draw up research agreements (defining the workplan, pricing, intellectual property rights, etc.);
- an active patent and licensing policy is pursued with respect to the results of university research, in order to create the required conditions for successful commercialisation, which in turn procures additional funds for further scientific research;
- establishment of new research-oriented and innovative spin-off companies: professional advice and support as well as access to venture capital - by means of the Gemma-Frisius Fund K.U.Leuven - and facilities - Innovation & Incubation Centre and Science Parks - is provided to entrepreneurs who want to set up a new, research-oriented business that makes use of the university's knowledge or technology;
- promotion of high-tech entrepreneurship and innovation by stimulating networking initiatives such as Leuven.Inc (Leuven Innovation Networking Circle) and technology clustering such as DSP Valley and L-SEC (Leuven Security Excellence Consortium).

In 2001, K.U.Leuven Research & Development turnover was 39.5 million euro. The patent portfolio has been extended by 45 new applications. The number of spin-off companies has been increased to 43, in total employing more than 2000 people.

Further References
The Research Co-ordination Office, in close cooperation with the university's broker, K.U.Leuven Research and Development (LR&D) will be happy to provide all pertinent information on K.U.Leuven research activities and do whatever is possible to facilitate contacts between its researchers and the outside world.

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CWIS, the Campus Wide Information System[1] is the university's link between a number of crucial services, our own students and researchers and hundreds of thousands of visitors. Its wealth of information and its diverse uses and particularly its 'research activities' database are still growing. Visitors will experience CWIS, and particularly the 'research pages'[2], as an efficient way to search for teaching and research staff, research topics, collaborations, scientific publications, key domains, career opportunities, etc..

1 http://www.kuleuven.ac.be/english/
2 http://www.kuleuven.ac.be/research/

Limburg University Centre

Limburgs Universitair Centrum (LUC)

Organisation

The Limburg University Centre (LUC), founded in 1973, undertakes programmes of education and research in its three constituent faculties:

- Faculty of Applied Economics;
- Faculty of Science;
- Faculty of Medicine.

Educational and research activities in the 3 faculties are organized by 6 departments:

- Department of Economics and Law;
- Department of Business Studies;
- Department of Man, Society and Communication;
- Department of Mathematics-Physics-Informatics;
- Department of Chemistry-Biology-Geology;
- Department of Basic Medical Sciences.

Several research groups within these departments promote and manage their research activities in the framework of the following multidisciplinary research institutes:

- Institute for Materials Research (IMO);
- Expertise Centre for Digital Media (EDM);
- Centre for Environmental Sciences (CMK);
- Social-Economic Institute (SEIN);
- Institute for Applied Economic Research (ITEO);
- Center for Statistics (CenStat);
- Institute for Biomedical Research (BIOMED).

In 2001 the Flemish and Dutch Ministers of Education signed an agreement which founded the transnational University Limburg (tUL). In the framework of this (seperate) institution academic staff from the LUC and from the nearby Universiteit Maastricht (in the Dutch Province of Limburg, the Netherlands) jointly undertake research activities and offer degree programmes from the academic year 2001/2002 onwards.
The orientation of research within this tUL will take shape within the schools for 'Life Sciences' and 'ICT'. In the future the transnational University Limburg may be expanded to include a School for Educational Sciences. Moreover the LUC Faculty of Applied Economics and the Maastricht Faculty of Economics and Business Adminstration are exploring the opportunity of different types of cooperation in research and teaching.

Within the province of Belgian Limburg the LUC is forming an association with two schools higher education. This is a consequence of the restructuring of higher education in Flanders but this cooperation will also have an influence on the research activities as teachers of the other schools will carry out research in areas that fit in the current activities at the university.

Research Policy

The LUC wants - through high quality scientific research of international level - to offer a continuous basis for the educational programme and contribute to an excellent formation of students and young researchers. The international dimension of research has to contribute to the strengthening of knowledge infrastructure in the region and offer growth possibilities for economic activity in the region. The realisation of this mission is possible through following objectives:

- stimulation of networking and internationalisation: a relatively small university like the LUC has to identify worldwide opportunities to expand its research activities by offering its own specialities to large research consortia;
- concentration of research expertise: especially for groups in the experimental sciences this is necessary to play a significant role on the 'international research market'. Concrete result of this concentration is the foundation of seven interdisciplinary research institutes, where fundamental and applied research are in balance. Through clustering of research expertise and bringing together a critical mass of human potential

recognizable research centres could be formed which all work interdisciplinary. Also the research programmes set up within the tUL show clustering of scientific efforts;
- support of new and promising research: the research council reserves specific budgets for promising research;
- scientific services and knowledge transfer to the region: the presence of the university and schools forms a regional magnet in the region. The success of the Science Park is a good example of this;
- participation in all kind of funding schemes for scientific research: a considerable part of the money is acquired on basis of a competition between universities and research institutes in Belgium and abroad. Only outstanding quality and specific expertise make it possible to obtain this kind of funding;
- quality assessment and improvement: the evaluation of research is a permanent point for special attention of the research council, both 'ex ante' at the selection of projects and 'ex post' with the assessment of the output of researchers and groups.

Research Activities

From the beginning research activities were mainly concentrated on exact sciences and basic medical sciences. Since the integration of the Limburg Business School in 1991 research also started in economics. In a special situation are the 'supporting' sciences (sociology, law, languages) as the university has no degrees in these subject areas. The result of concentration is that major research activities are organised within the institutes.

The *Institute for Materials Research (IMO),* with a staff of more than 100 people, is a high-tech research centre active in the field of materials for microelectronics. It combines physicists and chemists. Since July 2001, the Interuniversity MicroElectronics Centre (IMEC) created a new division, called IMOMEC, at the University Campus in Diepenbeek. At the same time, IMO became an associated laboratory to IMEC. Both IMOMEC (Institute for Materials Research in MicroElectronics) and IMO collaborate intensively. While the more fundamental research is carried out at IMO, applied research and projects in collaboration with industry are concentrated within IMOMEC.
The joint activities of IMO/IMOMEC concentrate on wide band gap materials, organic materials for electronic applications, precursors for nanomaterials, electrical characterisation and reliability, bioelectronics and physical and chemical characterisation.

The *Expertise Centre for Digital Media (EDM)* is a research institute located at the Science Park in Diepenbeek. EDM is active since 1987 in the area of information and communication technology (ICT) and has a professional staff of 50 highly skilled ICT-specialists. EDM focuses on:
- multimedia and internet technology, concentrated on networked virtual environments and interaction between users;
- human-computer interaction, research on innovative graphical or multimedia user interfaces for stand-alone and networked environments, multimodal user interfaces;
- computer graphics, computer animation and virtual reality, with special attention to modeling and rendering.

Centre for Environmental Sciences (CMK) In this research centre biologists, chemists, economists, lawyers and physiologists develop an interdisciplinary scientific approach for solving environmental problems. The core compentences of the institute are:
- the development of original and economically realistic strategies for remediation of soil and other substrates, contaminated with heavy metals and/or organic contaminants, eg. by phytoremediation, phytoextraction,...;
- development of ecotoxicological test procedures using plants and invertebrates;
- chemical speciation and modelling;
- evaluation of industrial wastes as potentially valuable products for soil remediation;
- impact studies of industrial processes on the environment;
- cost/benfit analysis of soil remediation, environmentally safe alternative procedures and recycling;
- risk of pollution for animals and human beings;
- ecohydrological research,....

The *Institute for Applied Economics Research (ITEO),* founded in 1997 by staff members of the Faculty of Applied Economics combines the knowledge and expertise originating from the activities of different research groups conducting scientific work in the fields of economics and business studies. Research in concentrated on:

- business administration;
- regional and spational economic analysis;
- data-analysis and modeling.

Social Economic Institute (SEIN) The core competence at SEIN comprises themes like women and their participation in society, women and the job market, needs analyses, senior citizens, sociolinguistics (language and gender, language and power), health psychology, and violence in the domestic field and at work.

Centre for Statistics (CenStat) The strong growth of statistical activities at the LUC motivated the creation of a 'Centre for Statistics' in May 1998. In this way, teaching, research and consulting could interact even further. CenStat provides an ideal environment for interdisciplinary cooperation. The Centre for Statistics has an international reputation in statistical research (both theoretical and applied). In the domain of mathematical statistics, research is carried out in a.o. the following fields: bootstrap methods, smoothing techniques, censored data, asymptotic theory. Research in applied statistics focuses on longitudinal data analysis, clustered data, missing data, multivariate methods, clinical trials, epidemiological studies.

The *Biomedical Research Institute (BIOMED)* was founded in January 1999 and combines the expertise of the former Dr.L. Willems-Institute and the research activities of the faculty of medicine. The fundamental research of the institute focuses on the pathogenic mechanisms of autoimmune diseases such as multiple sclerosis and rheumatoid arthritis, and on the physiopathological mechanisms of cell injury and cell death resulting from stress factors such as cytokines, toxines and ischemia. Main emphasis is on the development of novel therapeutic approaches for autoimmune diseases.

Technology Transfer

Scientific services and knowledge transfer are the third fundamental task of the university. The strong growth of applied research have contributed to the foundation of the seven research institutes. They are the main actors for technology transfer in the region. In 1997 the LUC started a central interface office whose main tasks are:

- the stimulation of an enterpreneurial atmosphere among scientists and students;
- help researchers in the process of the protecting of their knowledge;
- function as a bridge between the university and companies in the region, cooperate with other intermediary organisations.

The Science Park at the university campus hosts several of the above mentioned research institutes and attracts high-tech companies to start or develop collaboration with the knowledge institutes on the campus. The presence of this park with its incubator offers spin-off companies the possibility to settle in a research oriented environment. Also it offers the opportunity to new high-tech companies to develop research oriented activities in collaboration with LUC research groups.

Further References

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University of Antwerp

Universiteit Antwerpen (UA)

UNIVERSITEIT ANTWERPEN

Organisation

The confederate University of Antwerp (UA) was created in December 1995 and consists of three closely cooperating campuses which used to be independent institutions: the Universitair Centrum Antwerpen (RUCA), the Universitaire Faculteiten St.-Ignatius Antwerpen (UFSIA) and the Universitaire Instelling Antwerpen (UIA). It is governed by the UA General Council which is chaired by an elected Rector-President.

Because of their different history, these three institutions have their own tradition and culture, and are largely complementary. RUCA and UFSIA were originally two separate educational institutions, which were specialised in economic sciences. Both were founded in 1852 and both acquired university status in 1965. UIA was founded in 1971. The confederation has now approximately 9000 students, which makes it the third largest university in Flanders.

Within the Association of the UA - with four of the professional higher education institutions of the region - the UA plays a leading part. With a total of some 25,000 students it will become one of the major associations in Flanders.

Research Policy

Academic teaching at the UA is closely linked to original scientific research carried out by the University's academic staff. The university institutions, which are part of the relatively young UA, were from the start forced to actively seek external funding for scientific research. Thus, the research component (primarily externally funded) has come to occupy an important place. Since its teaching programmes are exclusively intended for 2nd stage and postgraduate education, UIA is most strongly research oriented.

The figures illustrate this solid research orientation in a number of ways: the UA derives about half of its income from external funds for scientific research. Besides the 850 academics supported by the operating allowances, over 700 researchers (employed on externally financed research projects) exclusively conduct research. Annually, more than 3,000 original scientific works are published, and every year around 70 of the over 600 graduate students obtain a doctorate (PhD). Furthermore, about 400 students annually obtain a postgraduate degree at the UA. Besides fundamental and basic scientific research, a great deal of applied and policy-oriented research is carried out. The supranational, federal and regional governments and the private sector or national and international foundations commission research from the Antwerp researchers. Apart from these quantitative data, research at the UA is also of high quality. UA researchers are members of top-quality international research teams and achieve excellent results in strictly competitive inter-university selections. The UA houses internationally renowned teams in several research fields. As for the natural and biomedical sciences, a recent bibliometric study, as well as an exhaustive peer review research assessment exercise have both shown that in every field of these disciplines UA teams have achieved high visibility in the world. Since high-quality research is carried out in each of the UA's faculties, teams from these disciplines participate in national and international programmes on fundamental research funded by leading grant providers.

The research policy aims at the development of new and the strengthening of existing centres of excellence, by providing them with internal research funds and additional tenured researchers in order to reinforce their competitiveness on regional, national and international level.

Scientific research is an important part of our mission as a university. It is vital both to our educational activities at the undergraduate level and to our postgraduate programmes. Hence it is essential to show what we are doing in our respective, very specialised areas of basic research and applications. More detailed information can be found on the university's home page[1] or in a set of brochures, describing the research topics of the members of our tenured staff, obtainable on request[2].

Research Activities

The UA consists of 7 *Faculties* which are characterised by high quality teaching based on fundamental and applied research centred around a number of centres of excellence:

- the Faculty of Applied Economics, which has recently originated from the two formerly independent ones at UFSIA and RUCA, is quite big and has many research interests, such as business economics, socio-economic research, transport economics, energy and environment, etc;

- within the Faculty of Pharmaceutical, Biomedical and Veterinary Sciences major research groups are active in the fields of neural diseases and inherited diseases, cell biology, pharmacology, pharmacognosy, clinical biochemistry, biotechnology, animal physiology and morphology,...;
- the Faculty of Law focuses a.o. on the foundations of law, sociology of law, penal law, international and European aspects of law and trade law, history of law, social law,...;
- the Faculty of Arts has several centres of excellence, such as economic history, linguistic pragmatics, Dutch literary history, cultural philosophy, religious sciences (Ruusbroec), modernism,... Furthermore it operates important academic and post-academic courses in teacher training, based on a large share of high quality research;
- within the Faculty of Medicine important research topics include cell biology and cardiology, gastro-enterology, cytology and histology, epidemiology and public health, nephrology, microbiology, medical genetics, immunology, physiology, anatomy,... A university hospital, situated on the UIA-campus, provides highly specialised health care to the Antwerp region, and has major teams active in clinical research, complementary to the important fundamental research within the Faculty itself;
- the Faculty of Natural Sciences covers a vast array of domains within the traditional departments of physics, chemistry, biology, mathematics and information sciences. Amongst the numerous centres of excellence those in elementary particle physics, solid state physics, materials characterisation, micro- and trace analysis, environmental physiology, rodent biology and pest control, biological evolution, plant physiology and –genetics, databases and communication, algebra, numerical analysis,... should be mentioned;
- the Faculty of Political and Social Sciences is characterised by strong research efforts in the field of sociology and social policy, welfare, communication sciences, political studies, international relations,...

Besides the Faculties, some *independent research schools* (institutions) exist within the University, some of which should be mentioned especially:

- the oldest and most famous one is the Institute for Development Studies and Policies (IOB), the former Institute of Development Policy and Management (COL) of RUCA. It was reinforced and enlarged with the complementary teams from UFSIA (research Department for the Third World) and UIA (Human Rights Study Centre);
- the University of Antwerp Management School (UAMS) offers continued and post academic education in a broad array of management studies, based on original scientific research, mostly commissioned by external bodies;
- the Institute of Transport and Maritime Management is very well known for its teaching and research activities in the field of logistics and harbour and maritime management;
- from its onset Environmental Studies were a priority for the UA, reflected in a large and interdisciplinary Institute of Environmental Studies. Recently strong attention was paid to sustainable development, the UA having adhered to the Copernicus charter;
- in 2001, the Institute for Jewish Studies was recognised by the Flemish government as an independent School within the UA, and designated as the Flemish public body for interdisciplinary research linked with Jewish matters.

The high quality and the performance of the research teams of the UA was recently proven by their participation and recognition, after public calls and severe selection procedures, as well in a series of *centres of excellence* of the Flemish government as from the Federal State, both in mid-term programmes.
Within the Flemisch Interuniversity Institute of Biotechnology, the UA holds the department of Neurogenetics. In the federal programme of the Interuniversity Attraction Poles, the UA holds the lead in interuniversity programmes on Nanotechnology, Molecular Genetics and on Neuro-endocrine interactions in the gastrointestinal pathway.
Furthermore research units of the UA were selected to carry out fundamental and policy oriented research for the Flemish government in the domain of environmental policy sciences, of environment and health, of public policy sciences, of education and labour market policy and of equal opportunities policy,...

1 http://www.ua.ac.be/research
2 karen.vancamp@ua.ac.be

Technology Transfer
The UA stimulates researchers to bring their invention to the market. The University participates in an early stage venture capital fund, the Antwerp Innovation Centre n.v.. An on-campus business centre (UBCA) facilitates incubation.
The Researchpark Waterfront hosts innovated companies. The link with society and industry is intensified by a dynamic innovation policy. Since the beginning of this policy 8 spin-offs or license agreements are realised[3].

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Ghent University

Universiteit Gent

Organisation

The Ghent University (RUG) was founded in 1817. The university's activities (and its buildings) are well intertwined with the socio-economic life of the city of Ghent, a historical harbour city in the north-western part of Flanders.

RUG is one of the largest universities in Flanders and serves a student population of 23.300. A total staff of about 5.750 people work at RUG. 3.164 of them is directly employed on the basic allowance of which the teaching activities are financed This number includes 841 professors (tenured staff) and 809 assistants. As all personnel cooperates to perform the three essential roles the institution has set forward (academic education, scientific research and community service), a major part of their activities comprises research. Of the total staff, 2.583 people are financed by research activities, allocated on a competitive basis. This number comprises 1.840 researchers and about 743 technical and administrative employees.

RUG is a fully-fledged university. Bachelor's, Master's and doctoral degrees can be obtained in practically all fields of study. The university also organises postgraduate, open university and continuing education courses. In order to perform these educational tasks, one of the main objectives of the university is to perform scientific research at the highest possible levels of excellence.

Research Policy

According to its mission statement, RUG distinguishes itself as a socially committed and pluralistic university that is open to all students, regardless of their ideological, political, cultural or social background. It wants to define itself in a broad international perspective, whilst accentuating its individuality in terms of language and culture. RUG offers a broad spectrum of high-quality research-based educational programmes that are constantly being adapted to the most recent scholarly and scientific developments. Educational and research activities are situated within the broader social context and remain in continual dialogue with all parties concerned. It is further the aim of RUG to promote and further develop fundamental independent research in all faculties to be a world player in the selected fields of endeavour; and to be an enterprising university with a focus on the social and economic applications of its research findings.

Most of the research funding available at RUG is distributed on the basis of a competitive selection procedure, which is organised either by the university itself (the Research Council), by funding agencies of the regional and federal governments, or by international organisations, in particular the European Community. Revenues from external research funding represent an increasing part of the university's budget (up to 40 %).

The Research Council is the body of RUG that advises on research matters of the university. It consists of the Rector, the Academic Manager, the Director for Research Affairs, the Secretary and 22 elected members (two professors per faculty).

Research Activities

In the scope of this presentation, the different fields of the research are displayed only on a general level, hopefully without doing any injustice to the high level of specialisation of all the research activities.

The currently existing 140 academic departments of RUG are organised in eleven faculties, occupying about thirty sites in and around the city of Ghent.

The Faculty of Arts and Philosophy has more than 100 professors and 168 assistants and other research staff. The research topics comprise philosophy and moral sciences, arts, archaeology, history, comparative sciences of culture languages, linguistics, literature, and cultures of ancient and modern Europe, the Near East, Africa, and South and East Asia.

The following four faculties could be grouped as 'socio-economic' disciplines. Some 150 tenured staff and 477 assistants and other research staff are active in the fields mentioned:

- Faculty of Law: legal theory and history, civil law (a.o. environmental regulations), contract and insurance law, commercial and financial law, international public law, social security law, labour and social security law, public and tax law, and penal law and criminology are research topics;
- Faculty of Psychology and Educational Sciences: with data analysis, developmental and personality psychology, experimental psychology, behaviour therapy and counselling, psycho-analysis and clinical consulting, pedagogy, teaching sciences, special education, social intervention, culture and leisure studies, personnel management, work and organisational psychology;
- Faculty of Political and Social Sciences: communication studies, population studies and social science research methods, political science, sociology and third world studies;
- Faculty of Economics and Business Administration: general economics, financial economics, social economics, accountancy, management control and taxation, corporate finance, marketing, management information, operations management and technology policy, and management and organisation.

RUG collaborates closely within the Vlerick Leuven Gent Management School, a well reputed management school which performs management research and supplies management and business degrees on a postgraduate level.

The *Faculty of Science* is one the largest faculties at RUG, with 150 professors, about 90 assistants and more than 550 scientific staff members, financed by research funds and collaborative research contracts. The disciplines represented are pure mathematics and computer algebra, applied mathematics and computer science, mathematical physics and astronomy, solid state sciences, subatomic and radiation physics, inorganic and physical chemistry, organic chemistry, analytical chemistry, biochemistry, physiology, microbiology, plant and animal biology, ecology, molecular genetics and molecular biology (the latter two undoubtedly at an international top level and included as major departments of the Flanders Interuniversity Institute for Biotechnology - VIB), geography, geology and soil science.

The *Faculty of Engineering* is also quite large: some 130 professors, 88 assistants and about 310 other scientific staff members. The research activities performed in this faculty concern architecture, urban planning; flow, heat and combustion mechanics, mechanical construction and production, structural engineering, control engineering and automation, chemical engineering, technical chemistry, environmental engineering, civil engineering, metallurgy, materials science, textiles, electrical power engineering, electronics and information systems, information technology (the latter two in close cooperation with the Interuniversity MicroElectronics Centre - IMEC), telecommunications and information processing, mathematical analysis, applied physics and industrial management.

The *Faculty of Agricultural and Applied Biological Sciences* has about 60 professors, and 280 assistants and research staff members. The research fields covered are agricultural economics, agricultural engineering, plant and animal production, crop protection, food technology and nutrition, biochemical and microbial technology, organic chemistry, applied analytical and physical chemistry, forest and water management, soil management and soil care, applied ecology and environmental biology, and molecular biotechnology.

The *Faculty of Medicine and Health Sciences* is another major faculty. It has more than 190 professors and 374 assistants and other research staff members. A large university hospital is connected to the faculty of medicine and health sciences, and the hospital staff amounts up to more than 4,000 people. Research performed at this faculty deals with more general subjects such as human anatomy, embryology and histology, clinical chemistry, microbiology and immunology, pharmacology, general physiology, human physiology and pathophysiology. Research performed in clinical fields of specialisation comprises anaesthesiology, internal medicine, surgery, dentistry, dermatology, paediatrics and medical genetics, uro-gynaecology, radiology, radiotherapy and nuclear medicine, ophthalmology, oto-rhino-laryngology, physical medicine and orthopaedic surgery, rehabilitation sciences and physiotherapy, movement and sport sciences, psychiatry and medical psychology. Public health, pathology, forensic medicine, general practice and primary health care are also fields of study. The research of this faculty within the field of biochemistry is also included as a department of the Flanders Interuniversity Institute for Biotechnology – VIB).

The *Faculty of Pharmaceutical Sciences*, a relatively small faculty of 20 professors and about 80 assistants and research staff members, is active in the scientific disciplines of pharmaceutics, pharmaceutical analysis and bio-analysis.

RUG is the only Flemish university with a *Faculty of Veterinary Medicine*. About 40 professors and 147 assistants perform research in the field of virology, parasitology and immunology, physiology, biochemistry and biometry, pharmacology, pharmacy and toxicology, morphology, pathology, bacteriology and poultry diseases, veterinary food inspection, animal nutrition, genetics, breeding and ethology, obstetrics, reproduction and herd health, medicine and clinical biology of small animals, medical imaging, surgery an anaesthesiology of domestic animals, internal medicine and clinical biology of large animals.

More detailed information on the research activities carried out at the different departments of RUG is available on a CD-ROM. Each research group is presented with its research areas, perspectives, selected publications and keywords. This instrument was compiled in cooperation with the departments and researchers themselves. The CD-ROM can also be consulted on the website of the Research Policy Office of RUG[1].

Technology Transfer
RUGTech is the technology transfer office responsible for protecting and commercialising RUG's intellectual property and manages all University IP matters (including patenting and licensing). RUGTech is also responsible for the development of University spin-off companies and business infrastructure (incubation centres, research parks). Whatever business opportunities organisations seek, RUG offers reasonable terms in all aspects of business negotiations.

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An overview of the research activities at RUG can be found on:
http://aivwww.rug.ac.be/Onderzoeksbeleid/techno2002/EN/index.htm.

1 http://www.admin.rug.ac.be/Onderzoeksbeleid/techno/index.html

Brussels' Free University

Vrije Universiteit Brussel (VUB)

Organisation

Brussels' Free University (VUB) was founded in 1970 as a Dutch-speaking spin-off of the French-speaking Université Libre de Bruxelles (ULB). It has since developed as a completely independent university, though still ideologically related to the ULB, with which it maintains a wide-ranging collaboration in many different areas.
The VUB nowadays is a medium-sized university, with some 9,000 registered students. About 1,300 VUB students are from outside Belgium, of whom some 750 come from Asia, Africa and South America. The VUB offers a broad academic programme, including a wide range of postgraduate courses, many of which are taught in English for students of all nationalities. As a member of European and other international university networks the VUB aims to promote cooperation in the fields of education and research, working towards greater mobility of staff and students.
This young but fully-fledged university is also the largest Dutch-speaking employer in the Brussels Region. Centrally situated in the capital of Europe, the VUB wishes to participate in the expansion of a dynamic forward-looking Flanders and Brussels, in a spirit of pluralism and sincerity based on the fundamental principles of free inquiry.

Both campuses of the VUB are easily accessible. The main Etterbeek campus with 7 faculties is a very green campus with academic, social and sporting facilities for students and personnel. It will soon also house the Research Centre for Molecular Biology which is still situated at St-Genesius-Rode, but is scheduled to move to new buildings. Here too you can find the Institute for European Studies (IES) and Vesalius College (VECO). IES is a national centre attached to the Law Faculty of the VUB and which focuses on EU studies within the context of globalisation. Unlike other reputed academic institutions, the aim of IES is not simply to develop EU-law-based programmes, but rather to bring the study of law and related research into the international and comparative arena. Vesalius College offers qualified students the opportunity to study in English at an American-style liberal arts college in Brussels.
The Faculties of Medicine & Pharmacy and of Physical Education & Physiotherapy are located on the Jette Campus, which also houses the University Hospital and a College of Nursing. Just like the Etterbeek Campus, the Jette Campus is fully equipped for the academic, social and sporting interests of students and staff. Both campuses have day-care centres for pre-school children. All medical courses and research in the broad sense take place here (medicine, pharmacy, dentistry, the biomedical and paramedical sciences, medical sociology). The proximity of the University Hospital, one of the largest hospitals in Belgium, and the interaction between faculty and hospital creates a surplus value for both.

Research Policy

VUB research teams in many domains are recognised as centres of excellence, conducting broadly based fundamental and applied research, often with an international scope. Examples are artificial intelligence, information technology, computing, (medical) image processing, instrumentation and measuring systems, chemometrics, reproductive medicine, immunology, diabetes research, cancer research, elementary particles, molecular biology and biotechnology, genetics, opto-electronics, alternative energy, new material research. In the humanities we may cite the international reputations of our departments of history, political science, philosophy, sociology, language & literature, psychology, communications science, applied economics. In the Law Faculty, the Institute of European Studies has already been mentioned, but the Faculty clearly has a solid reputation in all branches of law and in criminology.
Fundamental and applied research also have interdisciplinary implications, e.g. the use of donor material in medically assisted procreation is investigated from the psychological, ethical and legal points of view. The Leo Apostel Research Centre was set up in line with the wishes of our internationally renowned philosophy professor precisely in order to encourage interdisciplinary studies.
Moreover, the VUB actively encourages research initiatives which are in line with its philosophical foundations and sense of social responsibility. Research on topics such as bilingualism, multicultural societies and migration, with emphasis on the situation in Brussels and the question of integration, gathers together researchers from such disciplines as history, political science, sociology and demography. Protection of privacy, computers and the law also combine to constitute an interdisciplinary research topic.

Several research teams also participate in programmes financed by the Flemish Government with a social purpose in the domains of education, welfare & health, environment and transport .
Structural research collaboration exists between VUB research teams and renowned institutions such as IMEC (Interuniversity MicroElectronics Centre), VITO (Flemish Institute for Technological Research), VIB (Flanders Interuniversity Institute for Biotechnology), TNO (Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek), VRT (Flemish Radio & Television) and many others. Numerous research teams also participate in European and international projects.
Anyone looking for more information about research at the VUB can consult the VUB Vademecum[1], which contains an overview of the research teams and ongoing research activities at the VUB. This online tool in English is aimed at a wide-ranging public, both internal and external to the VUB, including the international communities of science, business, industry and the media. The VUB Vademecum has been compiled by the Reseach & Development Department from information provided by the university research teams through the R&D central database. It is regularly updated and extended. With this tool we aim to improve the transparency of VUB research and to extend our external contacts.

Research Activities
Under the academic responsibility of the Vice-Rector for Research, the R&D Department supports the research policy of the VUB, providing logistic and administrative support to project proposals, distributing information on research funding, giving support to the advisory and decision-making organs of the university, such as the Research Council. Four other services, each under the supervision of an Academic Board, are also embedded within the R&D Department: the Interface Cell, Science Communication, the Research Internationalisation Cell and Overseas Development Co-operation.

The *Interface Cell's* main goal is to support and develop the university's third function, in which university knowledge, results of scientific research and technology are made available to society in general, including private industry. This can be done by means of research contracts commissioned by public authorities or by industry, and through other kinds of collaboration with third parties. It includes turning university research results into new products and services through existing companies by means of contract research or technology transfer, as well as generating new economic activity through spin-offs based on university know-how and expertise.
The Interface Cell is continually and pro-actively in search of university results with economic or social potential and also manages the intellectual property of the university. It organises start-up seminars to stimulate entrepreneurship at the university and provides start-up support to university spin-offs. Since venture capital is one of the crucial aspects of starting up a company, a starter fund, BI[3], has been set up by the university to help finance its spin-offs.
The Interface Cell also co-manages two science parks: the Zellik Research Park (Flanders), which accommodates the Brussels Innovation & Incubation Centre (IIC), and the Mercator Science Park within Greater Brussels.

Science Communication is responsible for the internal and external dissemination of information concerning science and technology at the VUB. In a larger sense the aim is to encourage the public to take an interest in scientific and technological developments, thus broadening the social base for these disciplines and encouraging future education. They specifically try to get youngsters involved in science and technology projects aimed at secondary schools. The ComiX-files, for example, is a contest that stimulates young people to look actively for scientific knowledge in comic books[2]. The Virtual Science Museum is another project, in which teams from secondary schools can participate in workshops to create their own website[3]. The results are collected in a virtual building on the web. Since 1988 Science Communication has organised a Science Week each academic year, where young people can actively participate in scientific workshops and meet VUB researchers. In the meantime, this happening has evolved towards a Science Week, in which all Flemish universities participate.
Occasionally Science Communication provides media contact for VUB faculties and individual researchers. Through press releases to the media, for example, young researchers have an opportunity to make their work known to a larger public.

1 Vademecum: http://rd-ir.vub.ac.be/vademecum
2 ComiX-files http://comix-files.vub.ac.be
3 Virtual Science Museum: http://www.vub.ac.be/wetenschapsmuseum

Researchers can contact the *Research Internationalisation Cell* for support and information with regard to European and international research projects. The VUB participates in many important European and international research initiatives. Specific EU-programmes in which the VUB plays an important part involve topics such as the quality of life, energy, the environment and information society technology.

The VUB research policy on *Overseas Development Cooperation* is characterized by a bottom-up approach: collaboration initiatives at researcher level can be supported by institutional agreements. The main tasks of this cell are to provide information, advice and follow-up concerning such research projects. The cell is also actively involved in promoting and organising international exchanges of researchers.

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Arteveldehogeschool

Organisation

The Arteveldehogeschool in Ghent (7,200 students) covers the following study programs:

4-year study program of academic level:

physiotherapy

3-year study programs:

- health care: podiatry, occupational therapy, speech therapy, audiology, nursing, midwifery;
- business studies: business management, communication management, office management;
- graphical and digital media;
- teacher training: training for nursery school, primary school or secondary school education;
- social work;

the Arteveldehogeschool has an international scope in teaching, research and rendering service to society.

Research Policy

Scientific research projects at the Arteveldehogeschool are encouraged in order to perform the commitment of generating, spreading and circulating expertise as well as technical know-how in the domains of its study programs. At the Arteveldehogeschool COMPahs is the centre co-ordinating applied research, community-based services and life long learning programs. Active prospection in order to promote applied research is one of the occupations of its co-ordinators:

- cooperating with the teaching staff of the basic study programs,
- in collaboration with organisations, companies or groups in the professional field, members of other institutes for higher education, universities, governmental bodies,
- if possible in a multidisciplinary way,
- often as a service-on-demand;
- by fund raising;
- by stimulating and facilitating publications, reporting of results via lectures, workshops or adult learning programs,
- national or international.

Research Activities

At present the main fields of applied research activity are :

- pediatric physiotherapy, focussing on standardization of movement tests for several populations;
- pelvic re-education focussing on anorectal, bladder and sexual dysfunction;
- locomotoric physiotherapy, integrating ergonomics, exercise physiology, neurophysiology and biomechanics;
- physiotherapy and psychomotoric problems focussing on the evaluation of psychomotor therapy in different psychiatric diseases;
- exercise physiology, studying influences of exercise on energy balance, immunological, endocrine and cardiovascular parameters;
- cardiovascular and pulmonary physiotherapy, focussing on chronic heart failure;
- physiotherapy in the elderly population focussing on the quality of care;
- occupational therapy in elderly care, psychiatry, physical rehabilitation, and in case of developmental problems;
- assessment of mathematical problem solving, mathematics disorders as well as comprehensive reading in primary school children;
- the relation between statement and affect in stuttering children's speech associated attitudes;
- mild and moderate hearing impairments in school children (aged 2.5-13 years);
- aspects of perinatal care as experienced by midwifes;
- prevalence of long-term post-partum complications in Flanders;
- health care of traumatic brain injury patients : a multidisciplinary study;
- practical research on the quality of casuistry;
- survey on the quality of action of the non-residential services for assisted independent living;

- evaluation of the socio-medical crisis centres for substance misuse;
- study of setting out a policy on adult education;
- study of the public support for nature conservation areas;
- survey on innovations in geriatric residential care;
- implementation of innovations in mental health care;
- analysis of the profile of members and committee members of the League of Large and Young Families;
- research on policy concerning youth cultures in Flanders;
- studies on innovation, development and analysis of social work;
- research projects resulting in communication advice.

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Erasmushogeschool Brussel

Organisation
The Erasmushogeschool Brussel is a multi-sectoral school in the centre of Brussels and includes nine departments, all of which are engaged in scientific applied research. It currently counts 4,000 students and a staff of 800 people. It has the following departments:

4 departments of academic education (masters)
- Industrial Engineering and Technology;
- Applied Linguistics;
- Music;
- Drama & Audio-visual Arts.

5 departments of higher professional education (bachelors)
- Communication Management;
- Nursing, Health Care & Teacher Training;
- Hotel and Tourism Management;
- Landscape Architecture & Environmental Studies;
- Social Work.

Research Policy
Applied research is highly valued at the Erasmushogeschool Brussel. In addition, the quality of the school's training programmes is greatly enhanced by the school's collaboration and frequent contact with private industry. Research and Development are co-ordinated by a councel (Raad voor Dienstverlening en Onderzoek). The Erasmushogeschool Brussel has installed two R&D funds: Research Incentive funding and PhD funding.

Many research projects are carried out within the framework of collaboration agreements with universities - especially with the University of Brussels (VUB) - companies, the non-profit sector and intermediary organisations, such as Indutec, a liaison organisation between higher education and industry of the Brussels Region.

Research Activities
The Department of Industrial Science and Technology conducts research in the areas of electricity, computerisation, telecommunication, multimedia systems, network control, software, electronics, transportation technology, aeroplane mechanics, electromechanics and construction techniques. They also do research on various business topics such as E-learning, ICT- management, training and logistics[1].

Research projects in the Department of Applied Linguistics (Translation and Interpreting) specialises on lexical terminology, localisation, subtitling, Dutch as a foreign language, language evaluation testing, European journalism, computer assisted vocabulary acquisition. They are partners in research with the University of Brussels (VUB), the University of Antwerp (UA), the Free University of Brussels (ULB), and the University of Birmingham / Limerick and Barcelona[2].

The Department of Music is in the process of making an inventory of their music library and is digitising music catalogues. They also conduct research on various topics in the history of music[3].

The Department of Drama and Audio-visual Arts Studies with focus on new multimedia projects (e.g. reality TV), performances, vocal training of professional speakers, photographie and studies on modern theatre and contempory movies[4].

Research projects in the Department of Social Work include work on human resources management and perceptions of life and society in collaboration[5].
The Department of Communication Management and Department of Hotel and Tourism Management does research concerning educational innovations and new didactical material[6].

Research projects in the Department of Nursing and Health Care include studies on topics in children's health care and research into virus detection and anti-malaria medicins[7].

The Department of Landscape Architecture & Environmental Studies conducts research in the areas of environmental technology, soil analysis, issues in waste water purification, environmental policy and environmental administration[8].

Further References

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Group T

Groep T Hogeschool Leuven (Groep T)

Organisation
Group T educates engineers in Leuven Engineering School and teachers in Leuven Educating School. ACE-Group T offers continuing education in technology, management and languages. Group T's mission equally includes applied research, services to society and the encouragement of contact and mutual understanding between peoples and cultures.

Research Policy
Group T participates in various regional, federal and international cooperation projects involving teaching and applied research programmes. Research is carried out on several levels: by academic staff in or in cooperation with enterprises or public authorities, by final-year students as a part of their in-company project and in collaboration with universities at home and abroad.

Research Activities
Group T Leuven Engineering School

- characterizing of degradation products of additives in polymers (in cooperation with Exxon);
- elaboration of procedures for environmental issues (in cooperation with the Flemish Government and the Flemish Environmental Society);
- multimedia and virtual reality technology applications (in cooperation with the University of Science and Technology Beijing, Huazhong University of Science and Technology in Wuhan and Zhejing University of Technology in Hangzhou.

Group T Leuven Educating School: optimal educational strategies in an IT-based environment for in-service teacher training in China through distance education (in cooperation with the Catholic University of Leuven and Beijing Normal University).

UNESCO UNITWIN network: Group T has taken the lead in establishing a UNESCO UNITWIN network on the synergy between Engineering, Educating and Enterprising with partner universities in Beijing, Bangkok and Belgium and its neighbours.

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Hogeschool Antwerpen

Organisation

The Hogeschool Antwerpen was founded in 1995 by a fusion of no less than seventeen prestigious institutes such as the Royal Flemish Conservatory of Antwerp, the Henry van de Velde Institute for Architecture, the Higher Institute for Translation and Interpreting, the Studio Herman Teirlinck, and the Antwerp Royal Academy of Fine Arts, with its renowned fashion department. Most of these Institutes were active partners in international university networks and exchange programmes before the fusion. The different departments of the Hogeschool are located in Antwerp, Lier, Mechelen and Turnhout.

The Hogeschool Antwerpen offers more than 150 courses of study in ten fields. Besides three-year professional training courses (of 1 cycle) in business administration, teaching, social work, health care, industrial science and technology, it provides four to five-year academic programmes (of two cycles) in architecture, physiotherapy, industrial science and technology, industrial design, and translation and interpreting. In addition, it also offers a wide range of courses in the arts, including visual arts, dance, drama and music. Most of the programmes in the arts also consist of two cycles. Together, the school's many departments attract over 6,000 students, which makes the Hogeschool Antwerpen one of the largest in its kind in Flanders.

Research Policy

The Hogeschool Antwerpen has developed a range of activities offering students ample opportunity for collaboration in services or research projects. It has acquired expert knowledge in the fields of industrial science and technology, industrial design, and architecture, whereas its academies for drama and dance, and its conservatory with its own symphonic orchestra, add to the school's cultural prestige. The Hogeschool is now preparing the conversion of its programmes into a Bachelor and Master structure. Programmes consisting of one cycle will lead to a Bachelor degree, whereas programmes of two cycles will lead to a Master degree, and all courses of study will be adapted to the European accreditation system. These imminent changes will no doubt further increase the appeal of the Hogeschool Antwerpen as a partner for other Flemish and European Institutions and it is looking forward to meeting these future challenges.

Research Activities

Departement Design Sciences D-sciencelab is the research laboratory of the department Design Sciences of the Hogeschool Antwerpen. It was founded in 1997, by staff members of the former department of Product Development and with support from the IWT HOBU-Fund, a governmental organisation that stimulates applied research in Flanders.

When, in 1999, the departments of Design Sciences and Architecture were unied under the department Design Sciences, the research activities of department of Architecture were housed (hosted) in the D-sciencelab.

Now this laboratory is becoming a dynamic centre for applied scientific research. At this moment we have several projects running funded by the IWT, but we also provide services towards industry, based on the expertise generated by our main research projects. Examples of such services are:

- ergonomical verifications;
- usability analysis using eye tracking,... (link: our services).

All our research activities fit within a range of well described expertises:

- ergonomic analysis and attention research of products, mainly screen interfaces (software, websites,...);
- studies that evaluate the potential of Product Development in industry;
- development of methods and techniques for methodic Product Development;
- development of guidelines for designing for the elderly (design for all).

Department of Industrial Science and Technology, Division Building Technology, Laboratory Construction, Asphalt & Bitumen In 1997, the research engineering department of the Hogeschool Antwerpen started a research program about the possibilities of recycling roofing felt waste and old asphalt pavement into a new product: a bitumen bounded base for asphalt road pavements. Since decades, roofing felt is fully dumped on rubbish-tips and old asphalt is not always used as a venerable application.
The research is done by standard tests (e.g. Marshall, Gyrator) in combination with computerprograms as VEROAD, PRADO, BISAR and NOAH, which are frequently used in pavement design for new roads in France, Belgium and the Netherlands; these programs help us to predict the behaviour of the material and to design the complete pavement structure. As a test case, 300 m^2 bitumen bounded base is laid at a parking-place.

The laboratory of the Hogeschool Antwerpen is well-appointed with sofisticated equipment for bitumen research such as a Dynamic Shear Rheometer to determine stiffness and viscous behaviour of binders and Brookfield viscometer for viscometry. Another part of the labo has got a bending and pressure test machine (400 and 3000 kN) for concrete.

The research team is co-ordinated by ir. A. De Jonghe, and two full-time engineers are daily doing research for the Belgian Government (HOBU-Projects) and industrial partners. Also, the team helps firms with their application forms for subsidy of innovating projects. More and more the research team arranges training-courses in rheology, bitumen and asphalt pavements.

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Hogeschool Gent

Organisation
The Hogeschool Gent offers tertiary education, but its mission equally includes applied research, community based services and the development of Arts.
Established in 1995, the Hogeschool Gent is the outcome of two merger operations involving no less than fifteen institutions of higher education, most of which can boast an established track record of decades if not centuries. The Hogeschool Gent is the largest and most varied in the country: some 14,000 students incl. postgraduates, nearly 800 FTE academic staff and some 76 basic courses.

Research Policy
The Hogeschool Ghent participates in a wide network of regional, federal and international cooperation programmes involving teaching, research and scientific and community-based services. Research, surveys, studies, etc. are carried out for business, noncommercial organisations and public authorities alike. Often partnerships are formed with other schools for higher education and universities at home and abroad.
RODO is the council in charge of research, community-based services and the development of the Arts. At present, most activities are carried out through CARS and CDPA. The Centre for Applied Research and Community Services (CARS) is a relevant asset of the Hogeschool Gent. This interdepartmental and interdisciplinary platform used to focus on technological research only, but following the 1994 Reform Act it widened its scope to other disciplines. The CARS now effectively stimulates and co-ordinates R&D and services to the community related to a majority of study fields. In the CDPA or Centre for the Development and Practice of the Arts, the current R&D-activities are oriented towards the preservation and restauration of contemporary art, towards the development of prototypes of acoustic and electromechanic soundsculptures and of specific software for both fine and performing arts. A third centre, focusing on business and management, will be established in the near future.
The Centres' activities contribute to an up-to-date academic profile, establishing close links with the professional field, official bodies and other partners at home and abroad.

Research Activities
The following is to be considered as an overview only.

Business, Language and Applied Information Technology
- marketing research on behalf of enterprises, project development in business administration;
- projects on marketing surveys and on software for enterprises (e.g. training courses in IT);
- course development on commercial communication (language technology);
- development of techniques and methods, based on a flow matrix of business parameters, to set up and follow up business plans;
- development of personal e-learning tools with a generic flavor, enabling exchange of e.g. curricula within educational institutes.

Health Care
- participation in development programmes regarding speech therapy, dietetics and occupational therapy in collaboration with professional organisations;
- advice on design of ergonomic equipment and devices;
- development of proper and safe ergonomic attitudes and techniques.

Social Studies
- applied research in the field of social work and special education on behalf of public or private organisations;
- R&D on discussion techniques and group decision methods, including joint training projects.

Teacher Training

- educational research on the 'World Orientation' for primary and secondary schools, R&D on techniques and methods of initial support for future teachers;
- research on equal opportunities and non-discrimination.

Technology

- development of quality control techniques for breweries and malt houses;
- development of analytical techniques for environmental (bio)chemistry;
- environmental biotechnology: development of modular and compact biological systems for waste water treatment-bioroll: synthetic (e.g. PET, etc.) biofilm reactor;
- wood technology: development of wood protection techniques and CNC-applications.

Engineering Sciences

- electronics: projects on power electronics and automation;
- electromechanics: rapid prototyping and tooling: stereolithgraphy (epoxy), laser sintering, prototype moulds (plastics, wax, metal alloys), injection moulds;
- building technology: static and dynamic tests of full-scale construction elements;
- chemistry: control analysis of the industrial atmospheres (human toxicology), development of techniques for recuperation of heavy metals in effluents by ions exchange;
- plastics: research on rheological, mechanical, physical, optical, thermal and chemical characteristics;
- textiles: analytical services of optical , mechanical, structural and chemical characteristics;
- textile finishing: colour management systems, optimization of dyeing processes (recipe development), management of ecological finishing systems, digital printing on hard substrates and textiles in an interface with plasma-, coating-, steam- and other treatment systems;
- biochemistry: R&D on microbiological purification of waste water, development of fermentation technologies e.g. propagation and banking of yeasts (brewery) and production of industrial enzymes.

Biotechnology, Agriculture and Landscape Architecture

- breeding programmes-IPM: integrated production/integrated pest management of crops;
- crop nutrition: uptake and translocation of macro/micronutrients and heavy metals, chemical analysis of plants, soils, substrates, water, fertilizers;
- animal production: nutritional evaluation of feeds and feed components on performances of ruminants, pigs, analysis of feedstuffs, feed technology;
- food analysis and technology, development of HACCP-programmes on behalf of the food industries;
- development of process and product control simulations on experimental pilot plants (dairing, milling, baking, brewery), set up of tracking and tracing systems in the feed and food chain;
- studies on landscape development in relation to pollution caused by agroproduction, environmental sanitation;
- DNA-fingerprinting technologies in the agro-sector: qualitative and quantitative detection of genetically modified organisms in feed, food ingredients and processed foods.

Business Administration and Public Administration

- postgraduate courses and training, R&D and services on accountancy and tax law, within HIAT (Higher Institute of Accountancy and Tax Law, a partnership with the Ghent University);
- postgraduate courses and training on management of education, on management of culture and art and social profit management ;
- consultancy and project studies on public management, marketing studies on demand, study projects on the administrative structures of countries and regions e.g. the Flemish Community, Belgium, the EU.

Translation Studies

- development of linguistic tools to support the translator in the daily work, e.g. thesauri, termdatabases, lexicons (medical MESH-thesaurus,...);
- development of knowledge management tools with a focus on language sensitive research engines.

Academy: Architecture, Audio-visual and Fine Arts

- experimental research concerning audio-visual, visual and architectural expression and media;
- interdisciplinary and visual projects concerning life and work of artists;
- projects and community based applications in the field of cultural management and of multicultural behaviour;
- R&D on ICT applications and performances.

Conservatory: Music and Drama

- musicological research and music research on composers and style periods with special attention for 19th century Flanders;
- participation in interdisciplinary programmes for score analysis;
- research in music education (e.g. didactics of music performance skills);
- research on community based learning (e.g. social acceptance of non commercial musical styles);
- R&D on experimental music technologies, on crossover (e.g. jazz & contemporary classic), on performances in experimental or uncommon spaces, on experimental armamentaria.

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Hogeschool Limburg

HOGESCHOOL LIMBURG
PARTNER IN DE ASSOCIATIE LUC - HL - PHL

Organisation
The Hogeschool Limburg (HL) is an autonomous institute of higher education, established trough an amalgamation of four former schools for higher education with more than 50 years of experience. It compromises four departments offering programmes in the following fields of study: Commercial Sciences and Business Administration, Industrial Sciences and Technology, Social Sciences, and Teacher Training. At this moment, the HL is a partner in the association round the Limburg University Centre (LUC).

Research Policy
HL is an institution where staff and students are inspired to find new challenges. It's an identifiable and open centre of knowledge. Its strategy is build upon new social developments and questions. Therefore, research, social services and postgraduate training programmes, have an important place in its core business. The objectives of the research policy at HL are:

- intensifying the collaboration with regional partners from the industrial, the political, the economical and social sector;
- stimulating the collaboration with other institutions for higher education and universities;
- stimulating new initiatives in applied research;
- developing a quality care system for the applied scientific research;
- increasing the participation to the second, third and fourth money flow.

Research Activities
Verpakkingscentrum: the 'VerpakkingsCentrum' is an independent research centre with test facilities for industry on materials (mainly paper, board and corrugated board) and packages in the field of gas permeability, basic characterisation, environmental influences of light, temperature and relative humidity, transport simulation (vibration, shock and dropping). Recently a new item, packaging innovation and eco design, was introduced to determine the environmental impact of new packaging concepts. Trough an integrated quality system according ISO 17025 it is aimed to offer an efficient, high standard service[1].

EMAP: the bending of sheet metal parts is an important process in the manufacturing industry. Modern press-brakes are numerically controlled, but the handling still demands a lot of manual manipulating of the work piece, which implies very labour-intensive bending work and a high safety-risk. All these disadvantages can be eliminated by using an innovative technology, which consists of an off-line programmed robot. A very thorough inventarisation of the developments is made within the project. Apart from that the application possibilities of robot-controlled press-brakes are being evaluated concerning the work piece-preparation and the eventual manufacturing of work pieces with mixed complexity. Furthermore an economic evaluation will stipulate which product-mix and in which product-environment this technology is preferable over traditional press-brakes[2].

JLAB: research-project concerning the development of a framework for distributed task systems based on Java technology. The project team wants to research the actual usability of Java technology, by means of a non-trivial project. For this purpose, a generic application for the delegation of tasks (a distributed task system) is specified in different situations of 'delegation'.
The framework. These specifications form the basis for developing generic components, re-usable will be tested on three 'real-life' situations:

- a distributed translation system;
- a distributed educational system;
- a distributed logging and diagnostic system.

The results can be used for specialised applications in certain technology gaps. Later on, the industry partners can continue to work on this[3].

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Nutec: development of mobile measuring equipment, which can be used for the detection of radioactive waste in scrap[4].

Further References

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Institute for Higher Education in the Sciences & the Arts

Hogeschool voor Wetenschap & Kunst (W&K)

HOGESCHOOL VOOR WETENSCHAP & KUNST

Organisation
The present Institute for Higher Education in the Sciences & the Arts (W&K) was founded on 8 March 1995 as a merger of eight partners: De Nayer Instituut, Honim, Kardinaal Mercier Instituut, Lemmensinstituut, Narafi, Sint-Lucas Architectuur, Sint-Lucas Beeldende Kunst and Vlekho. Its overall student intake amounts to approximately 6.000. This multidisciplinary institute primarily aims at opening up new horizons in two seemingly opposed fields, the sciences and the arts, and across the regional boundaries of Flanders.

The geographical distribution of the different Faculties between some of the historic cities of Flanders – Brussel, Gent, Leuven, Mechelen – adds to the uniqueness of the Hogeschool voor Wetenschap & Kunst. Its inter-regional recruitment, its transdisciplinary programme of studies and the extension towards external cultural, linguistic, educational and scientific domains all contribute to the main objective: an optimal realisation of universality.

The various subjects on offer can be divided into the following broad subject areas: Applied Linguistics, Architecture, Business Administration, Business Economics, Education, Industrial Engineering, Music and Dramatic Arts, Technology, Visual Arts.

Research Policy
The different departments can pride themselves upon a long tradition of scientific and artistic research. The emphasis hereby is on the social relevance and the added value for education. Research is carried out in participation with numerous partners: the industry, the artistic world, universities, institutes for higher education and various research institutes, both national and international.

Research Activities
The research projects are categorized under various areas, such as:

- structural engineering: geotechnical research, constructions;
- sustainable engineering: renewable energy sources, wastewater treatment, air pollution control;
- environmental-, feed and agricultural toxicology: food safety by means of Microbial Source Tracking;
- materials and materialsprocessing;
- electronical engineering: electromagnetic compatibility, digital techniques, wireless data communication;
- architecture and urban development;
- ICT;
- lexicography;
- didactics;
- translation studies, theory of interpreting, linguistics, literature.

These research areas are situated in the departments of Industrial Engineering, Technology, Architecture and Applied Linguistics.

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Hogeschool West-Vlaanderen

Organisation

The Hogeschool West-Vlaanderen has 5 departments, all of which are engaged in scientific research. The Hogeschool West-Vlaanderen covers the whole of the province of West-Flanders, yet attracts many students out of the province. It currently counts 4,000 students and a staff of 300 people, several of whom are only engaged in research. Others combine lecturing with scientific research. Scientific research is assigned to the teams of study, since we strongly believe in the necessary link between education and research. The Hogeschool West-Vlaanderen currently offers 20 different studies with 37 options. They are situated in the fields of engineering, business, health, social work and architecture.

Policy

The mission of the Hogeschool West-Vlaanderen states that it 'wishes to fulfil its social task as a permanent interaction between education on the one hand, and applied scientific research on the other.' In this respect the most important criterium to select research projects is the added value to the expertise of the organisation and education. As a professional and academic orientated institute the Hogeschool West-Vlaanderen concentrates on applied research in close cooperation with the industry and social-profit sector. The quality control on the projects is carried out with the clients during the process and at the dissemination. The fundamental research is done in cooperation with universities.
There is central and departmental co-ordination of the research projects, both within the academic and the professional fields of studies.

Activities

In the Department of Engineering (PIH) all the research is co-ordinated by the departmental Centre of Stimulating Innovation (CIS)[1]. The department also runs a specialized one-year master programme in industrial management together with the University of Louvain and ICAM of Lille, in which the Kortrijk-option covers a long research-project to be executed by a team of 3 or 4 master students.

- studies in environmental sciences and chemistry: soil research (soil sanitation, soil pollution); research on soil pollution by organic chlorinated hydrocarbons; platform on implementation of the use of biogasses in the processing of waste; research on ecological, fire excluding powders; research on optimizing the analysis of solvents; research on defining and characterizing gels;
- studies in industrial design: exchange project on the development of a centre of light technology; research on furniture textiles; development of turnable building-in downlightcilinder;
- studies in electro-mechanics: research on the consequences of large-scale use of light and office-equipment in public utilities; research on tension at speed-regulated drives. The section holds an accreditated testing laboratory on electronics and IT-equipment;
- studies in electronics and ict: research on the use of broad waves in video communication (5th frame); research on high frequency and optical communication techniques; research on the digital integration of multi media technologies.

Department of Business, Social and Health Studies (HIEPSO)[2]

- studies in tourism and leisure: development of a touristic digital programme for Flanders compatible with the European SWOT analysis; development of marketing and communications plan on tourism for specific regions and cities;
- studies in communications management: communications and marketing research for organisations and industrial sectors (international project on textiles);
- studies in occupational therapy: research on the use of speech technology for disabled persons;
- studies in secretarial administration and translation-interpretation: research on business and medical use of foreign languages; research on business and medical terms in translating.

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Department of Simon Stevin[3]

- studies in secretarial administration: research on digital business correspondence (international project);
- studies in Architectural Assistance: research on the use of AutoCAD;
- business studies: international comparative research on VAT; marketing studies for several organisations;
- studies in pharmaceutical and food laboratory: chemical and nutritional laboratory analyses.

Teacher Training Department (HPI)[4]

- research on the implementation of ict in new pedagogics and didactics.

Department of Social and Nursing Studies (Vesalius – HISS) [5]

- research on TQM in health centre;
- research on the use of psychology and psychiatry in social work;
- projects on human resources and job application process;
- research on social dimensions of education.

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Karel de Grote-Hogeschool

Organisation
The Karel de Grote-Hogeschool consists of six faculties on several campuses throughout the city of Antwerp. In these faculties we find the following study programmes:

- a bachelor degree programme in the fields of:
- Art and Design;
- Health Care;
- Commercial Sciences and Business Management;
- Industrial Sciences and Technology Teacher;
- Training Applied Social Studies.
- a master degree programme in the fields of:
- Art and Design;
- Industrial Sciences and Technology.

The Karel de Grote-Hogeschool offers up-to-date curricula to more than 7,000 students and employs almost 1,000 members of staff. Apart from regular day training, it also organizes a wide and diverse variety of postgraduate programmes.

Research Policy
In the field of Art and Design artistic approach and theoretical reflection go hand in hand in order to optimise professional skills. It is important to acquire these skills through applied research in daily practice. In the specific field of observation and expression, scientific research provides new input for curriculum development.

The Faculty of Commercial Sciences and Business Management focuses for a great deal on market research in intense cooperation with private companies as well as public services. The idea is to generate a win-win situation for all partners.

For Industrial Sciences and Technology, research is looked upon as a means to create high-standard training opportunities to the benefit of staff as well as students. In this way a two-way traffic between education and industry keeps curricula up-to-date and realistic.

What Applied Social Studies is concerned, the results of project-oriented scientific research is an important input in fine-tuning curricula. A permanent check-up of current scientific know-how on one hand and concrete experiences on the other, are important for the development of applied methodology.

Research Activities
Art and Design

- workshop Jewellery and Precious Metals: applied research on TIG-welding techniques;
- workshop Graphics: experiments on classic photography as well as relief printing, photogravure and lithography;
- workshop Three-dimensional Art: research on new epoxies in sculpture;
- research on Digital Image Making (especially on Irisprinter): cooperation with 'Positief', Vorselaar, Belgium;
- research on xerographic procedures in lithography: cooperation with the School of the Museum of Fine Arts in Boston.

Industrial Sciences and Technology

- waste water treatment: optimisation of the physiochemical and biological treatment of the waste water for tank-cleaning factories, tertiary and quaternary purification of waste water in tank-cleaning companies for partial reuse, treatment of biological and physiochemical sludge and highly contaminated waste water in a combination of thermophile aerobe membrane bioreactor and chemical cracking;
- automation (production automation): on-line collecting of information of heterogeneous platforms in order to offer them to a wide field of consumers;
- energy management: KIV projects - design of large thermal sun-energy systems (KMO Innovation Flanders), corrosion prevention in central heating systems.

Applied Social Studies

- development of suitable practical methods in support of trainers and coaches of elementarily-educated people;
- prospecting, development and integration in the daily training of new methods possibly focused on new social groups like poor people and immigrants.

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Katholieke Hogeschool Brugge-Oostende

Organisation
Research at the Katholieke Hogeschool Brugge-Oostende (KHBO) is done at the Faculty of Industrial Science and Technology. It is engaged in three core activities:

- education is the main core activity: the faculty is providing study programmes at bachelor and at master level;
- the faculty is participating in thematic scientific research via the 'HOBU-funds' projects and via contract-research;
- the faculty is providing social services to industry via the 'Technological Centre' which is a cell of the faculty.

Policy
The Faculty is offering research opportunities in the area of its scientifical and technical know-how. This know-how arises mainly from its educational personnel, its infrastructure, its laboratory-equipment and the close relation between the study programmes and recent developments in industry.
The transfer of the know-how and expertise to the students is an important objective of the different activities at the faculty, this by involving last-year students in the scientifical research and the social services. The result is a high added value to the different partners and the academic, industrial and social environment.
Also, by taking part in European programmes, the international relations of the faculty offer the opportunity of keeping in touch with recent innovative technology.

Research Activities
The faculty has earned authority in the area of:

Electronics

- micro-electronics (design of analogue and digital integrated circuits);
- ElectroMagnetic Compatibility and ElectroMagnetic Interference (EMC-EMI);
- microwave techniques.

Electro-Mechanics

- CAD-CAM-CIM software for evaluation and computation;
- plastics engineering;
- PLC and automation.

Construction

- admission of the ministery of public works for computations;
- recycling building material and the application of this material.

Chemistry

- chemical analysis of water/food;
- optimising the industrial preparation of vegetables.

As a result of, and related to the core research activities, the faculty is offering 4 advanced study programmes, open to students with a master degree:

- qualified in the continued study of Electronic System Design;
- qualified in the continued study of EMC (Degree of Master of Science in Electro-Magnetic Compatibility of the York University);
- qualified in the continued study of Aerospace Engineering: avionics;
- qualified in the continued study of Plastics Engineering.

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Katholieke Hogeschool Brussel

Organisation

The Katholieke Hogeschool Brussel (K.H.Brussel) offers tertiary education and is situated in the heart of Brussels. The college is founded in 1995 and is, as so many schools for higher education in Flanders, the result of a fusion of 3 former and smaller schools. The K.H.Brussel includes two departments: first of all the teacher training college, with about 700 students and secondly the department Health Education, with approximately 200 students. The teacher training department consists of 3 sections: a student can choose to become a nursery or kindergarten school teacher, a primary school teacher, or a secondary school teacher of general subjects, of physical education or of art. The department of health education covers a nursing institute with the following options: hospital nursing, paediatric nursing, geriatric nursing and psychiatric nursing. Recently we started a graduate in medical imaging. This training is unique in Flanders.

Research Policy

The college participates in a broad network of regional and international projects concerning education, social service and applied research. In Flanders all highschools are associated with universities. The K.H.Brussel takes part in an association with the Catholic University of Leuven. At the department of health education the applied research is organised by professional organisations of health care and medical imaging. In the teacher training department the applied research has its origin in STIHO projects (Stimulering Innovatie in het Hoger Onderwijs - Stimulation of Innovation in Higher Education) supported by the Flemish Government. The implementation of these research projects is realised by INTERACTUM, a regional cooperation of five teacher training colleges.

Research Activities

The Teacher Training Department takes part in two research projects (STIHO) aiming at educational innovation:

- MILE-Vlaanderen: a multimedia interactive learning environment as workmaterial to gain didactical and mathematical competence in the initial teacher training, in an independent and integrated fashion.
  This project aims at enabling teachers in training to explore and investigate the practice of mathematical education in primary schools. This way the teachers acquire didactical knowledge, skills and attitudes. MILE consists of digitalised videotapes of math classes and a program that allows the students to watch and study the videos in a intense and flexible manner.
  Furthermore, MILE includes supplementary materials such as discussions with experienced teachers, their journals, discussions with pupils and their written tasks. This project intends: to develop courseware; to develop a vision about the implementation of MILE in the teacher training program; to organise and record new lessons;
- BRIDGED: e-learning platform: the introduction of flexible and virtual learning platform will profoundly change the classic education systems, as well on the micro (the classroom), the meso and the macro level. On the micro and meso level, the implementation of ICT asks a great deal of attention to the new way of training teachers. The teachers coach students who develop an individual learning course. Together with our BridgED-Link partners we focus on optimising the BridgED learning platform[1], designing and developing new teaching methods and techniques, training teachers to deal with new teaching technology. To achieve this goal new working packs were defined in collaboration with other highschools: functional improvement of the e-learning platform; pedagogic and didactic design of learning modules; dissemination by expert training of teachers coordinating tasks in their training team; large dissemination by funding local e-learning communities; expertise tools; project management; project evaluation.

1 http://www.bridged.be

By order of the Department of Education from the Flemish Community the K.H.Brussel participates in the coordination of European projects on educational ICT innovation. Three projects are concerned:

- VALNET is part of the European Commission 'School of tomorrow' initiative. Goal is the implementation of very new ICT-projects in the broader educational field. Process-validation is monitored within an international scientific framework;
- ENIS: in a lot of European countries very innovative schools are selected by the national ministries; this is the European Network of Innovative Schools (ENIS). Schools are networked nationally and internationally. A lot of information on ICT-innovation is gathered. These expertise concerning ICT innovation and implementation is annually published and at the disposal of new schools connected to the ENIS network;
- VIRTUAL SCHOOL is one of the projects of European Schoolnet (EUN). Flanders initiated a department of primary education. One of the tasks of Virtual School is the selection and spreading of high quality educational freeware.

To support teachers and schools of primary and secondary education with the implementation of ICT the Department of Education of the Flemish Community founded Regional Expert Networks (REN). The teacher training of the K.H.Brussel takes part in two networks developed by the universities of Leuven and Brussels. In collaboration with the University of Brussels (VUB) a new concept of training-on-demand has been drawn up.

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Katholieke Hogeschool Kempen

Organisation
The Katholieke Hogeschool Kempen (KH Kempen) with its ten departments and 6,000 students has always been an impulse for regional development in the Kempen, a dynamic region in Flanders. Research facilities are embedded in most of the individual departments.

Research Policy
Research facilities are embedded in most of the individual departments:

- industrial science and technology departments (master and bachelor degrees) with (electro)-mechanics, electronics, ICT, logistics, chemistry and environmental technology;
- biotechnology department (master and bachelor degrees) with agriculture, horticulture, food technology and biotechnology;
- social work department with social counselling, social work, human resource management, socio-cultural work;
- health care departments with nursery, midwifery, occupational therapy, orthopaedics, dietetics and medical and pharmaceutical laboratory technology;
- commercial sciences and business administration departments with business studies, applied information technology and strategic SME management;
- teacher training departments.

Technological research and development projects are often in cooperation with spin-off companies. This is particularly important in ICT, electronics and industrial automation, in agriculture and horticulture, and in chemistry and environmental technology projects.

Research Activities
A large group in the Technological Departments is working on the development and implementation of internet and data acquisition techniques. Other activities include database design and implementation, system identification and real time operating systems. We also have build up a large experience in process automation and robotics.

Actual research and development topics in agriculture have to do with animal wellness, biological crop protection and optimisation of plant multiplication techniques for in vitro culture.

Environmental technologies focus on small scale chemical and biological water treatment.

The Department of Social Work conducts research in the area of social welfare, culture, labour and organisational behaviour. Also the development of new methodologies and instruments on a scientific basis is a major objective. Related research is also conducted in the health care department. The research topics are:

- the elderly: ageing and the problems of social exclusion; the needs of immigrant elderly; care for the aged at risk of marginalisation;
- the youth: the needs and expectations of the youth in a rural setting;
- gender;
- poverty: the problem of illegal living on camping-sites; the social situation of households;
- management: causes of failing introduction of total quality management.

Research topics in the health sector are :

- developing a new way of having breakfast for severely demented elderly;
- prevention of low back pain for students in nursing and midwifery;
- the image of health care professions.

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Katholieke Hogeschool Leuven

Organisation

The Katholieke Hogeschool Leuven (KHLeuven) is an institution of higher education located in the beautiful, historical city of Leuven. There are about 5,000 students and a staff of more than 700 people. The KHLeuven is associated with the Catholic University of Leuven, one of the oldest and most prestigious universities in Europe. The KHLeuven is currently composed of five departments and offers 1 cycle higher education (3 year bachelor programmes) and several post-graduate programmes. An overview of the departments and the education provided:

- Department of Business Management Studies (Echo): Accountancy – Taxation, Finance & Insurance, Marketing, Management Assistant (Secretariat-Languages), Business Translator and the Post-graduate 'SMART: Smart Competition on the European Market';
- Department of Teacher Training (DLO): Pre-school, Primary and Lower-secondary Teacher Training and the Post-graduate 'Teacher for children with special needs';
- Department of Rega: Medical Laboratory Technology, Pharmaceutical and Biological Techniques, Nutrition and Dietetics, Chemistry, Biochemistry, Environmental Protection, Industrial Process Technology, Medical Management Assistant, Applied Information Technology and the Post-graduate 'POST-I.T., a one-year modular programme in I.T';
- Department of Nursing and Midwifery: Nursing, Midwifery and the Post-graduates 'Specialised Nursing in Intensive Care and Emergency Care' and 'Specialised Nursing in Pediatric Care';
- Department of Social Studies: Human Resource Management, Social work, Socio-cultural Work, Social Counselling and the Post-graduate 'Leadership in the Social Field'.

Research Policy

The primary process of the KHLeuven is the preparation of students for the job market of the 21st century in an optimal way. Therefor each curriculum is student-, profession- and practice-oriented. Hence the KHLeuven recognises the importance of applied research and established links with the work field in underpinning teaching and curricula. In the knowledge and information based society of this era, the KHLeuven plays also an important role as a knowledge-transfer centre. In the mission of the KHLeuven is stated that 'the organisation will contribute to the socio-economic development of the wide region and society in general, by means of education, applied research and community-based services'.

Applied research and community-based services are being intensified by the recently created co-ordination office. This co-ordination office acts as a focal point for all research activities and offers a wide variety of services:

- preparation, elaboration and implementation of the research policy of the KHLeuven;
- advice on the allocation of the KHLeuven own research fund (e.g. co-financing, internal projects);
- stimulating the dissemination and valorisation of research results and activities;
- promoting and developing the expertise of staff and departments and encouraging new initiatives;
- promoting and intensifying (national and international) contacts and collaboration;
- encouraging multi-disciplinary activities and internationalisation;
- gathering and distribution of information regarding projects and funding as well as practical help;
- active prospecting on funding, partnerships, project calls and research programmes;
- follow-up, inventory and monitoring of the projects and applied research at the KHLeuven.

Research Activities

The research activities at the KHLeuven are diverse and include short-term investigations as well as large-scale projects. A considerable amount of research is undertaken in partnership with specific organisations or institutions. Each department develops research activities and provides community-based services in their field of expertise and related to the fields of study. The following is to be considered as an overview only. For all further enquiries, please contact our co-ordination office.

Department of Business Management
- qualitative and quantitative marketing research for enterprises and non-profit organisations;
- project development in business administration;
- projects on marketing surveys and business planning for enterprises;
- scientific services on marketing, communication and business planning;
- course development on commercial communication.

Department of Social Work
- market-research for local authorities and non-profit organisations;
- strategic and operational development in local authorities and non-governmental organisations based on stakeholders' surveys;
- screening of client registration in social work;
- development of quality management based on stakeholder-analysis in social services, non-profit organisations and human resources services;
- course development for clients and workers, based on social work research;
- development of survey techniques relevant to social work practice.

Department of Teacher Training
- in service teacher training (e.g. equal opportunities, multicultural society, inclusive society);
- implementation of ICT in teacher education and training;
- tutor-programme: coaching and counselling of tutors in education.

Department of Rega
- advice, training and development of intensive technical training programmes on demand (basic to advanced) in the fields of ICT- and web-applications, network-security and programming skills;
- supporting and training use of ICT in schools (Regional Expertise Network Flemish Brabant);
- food safety and hygiene – Hazard Analysis and Critical Control Point (HACCP);
- diet therapies for specific (patient)groups: research, development and advice;
- development of electronic courses on industrial cooking techniques (e.g. vacuum cooking).

Department of Nursing and Midwifery
- skills lab: training of technical skilfulness for volunteer aid and non-professional caretakers;
- development of preventive health care programmes for college students;
- nursing in an intercultural context: research, training and course-development;
- accreditation of prior experiential learning (APEL) and of prior learning (APL) in nursing.

The staff of the co-ordination office has conducted several studies on internationalisation:
- evaluation study on the implementation of Comenius 1 and Lingua E projects in the framework of the Socrates programme (in cooperation with Deloitte & Touche for the Commission DG EAC);
- evaluation of the VOTEC project (cooperation Flemish schools and Czech and Slovak schools) of the Ministry of Education of the Flemish Community;
- evaluation of the PHARE VET reform in Bosnia-Herzegovina (in cooperation with Deloitte & Touche for the European Training Foundation, EU, Torino);
- evaluation of the CONNECT initiative of DG EAC of the Commission of the EU;
- study on active young citizenship, Barcelona Forum 2004;
- comparative study of mobility of school teachers in the European Union (for DG EAC, Commission EU);
- manual to train Comenius 1 and 2 evaluators in the framework of the Socrates programme (in the framework of the EAVCO project of Comenius2 of Socrates).

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Katholieke Hogeschool Sint-Lieven

Organisation

The Katholieke Hogeschool Sint-Lieven (KaHo Sint-Lieven) is an institution of higher education with campuses in Aalst, Ghent and Sint-Niklaas. It is active in the field of education, services and applied research. It offers 1 cycle higher education (3 year study programmes e.g. health care, industrial sciences and technology, agriculture and biotechnology, teacher training, business administration) and 2 cycle higher education (4 year study programmes e.g. industrial sciences and technology). There are about 5,000 students and an academic staff of 350 persons.

Research Policy

Most of the applied research is done in the Industrial Engineering Department (2 cycle higher education) and in the Academic Services. Applied research is situated on several levels:

- research done by last year students, specially those final project works carried out at our own institute in our own specialized fields of research;
- research elaborated by non-profit associations (vzw's) and done for and paid by third parties;
- research projects supported by a large network of European, federal and regional organisations and programmes;
- research done by young assistants with the aim of obtaining a PhD degree.

Different groups in KaHo Sint-Lieven develop research activities. This research is carried out by about 40 Full Time Equivalents and funded by own financial means, granted by several funds or paid by companies.

Research Activities

Biochemistry (Group Biotech)

- brewing technology: yeast quality, high-tech hopping, flavour stability, development of special beers, geuze and lambiek-brewing (HOBU-Funds);
- application of enzymes in food production; in vitro evaluation of enzyme preparations; characterization of non-starch polysaccharides;
- meat technology: optimalisation of food ingredients and procedures in preparing meat products, minimal processing of cured meat, optimalisation of the colour of cured meat, search of meat for cooked meat (HOBU-Funds);
- solid state fermentation – spawn production technology (FAIR-CRAFT);
- microbial degradation of polyaromatic hydrocarbons and mineral oils in sludge (INCO COPERNICUS);
- course development (SOCRATES: Sefotech, MINERVA: ODL-learning, Leonardo da Vinci: Euro-BioHealth);
- the history of applied sciences: the production of distilled beverages.

Chemistry (Group Environmental Technology & Surface Treatment)

- selective recuperation of metals from waste water by Supported Liquid Membranes and Modified Electro Dialysis (MEWAPREV). This group also participates in TRAWMAR;
- selective recuperation of metals, removal of cyanides from waste water;
- metal surfaces and surface treatment techniques. New technology: plating on plastics.

Chemistry (Group Flavour Analysis)

- objective measurement of flavour quality;
- GC-MS analysis of various foods and drinks: wine, spirits, dairy products, cheese, coffee, different kinds of meat and meat preparations (raw ham, dried sausages) (HOBU-Funds, IWT);
- relation with organoleptic properties;
- fast sensory directed methods chemical analyses (chemnose).

Mechanics and Process Techniques

- programming of general postprocessors of NC-controllers;
- design for recycling: software development using an object oriented language;
- concept and design of prototypes of mechanical parts and machinery;
- research on high speed milling: definition and choice of the milling tools and parameters (HOBU-Funds);
- optimalisation of teach-in turning (HOBU-Funds);
- CAM for high speed milling;
- definition and choice of hard turning tools, optimalisation of moulding processes (HOBU-Funds);
- reduction of injection moulding cycle time (HOBU-Funds);
- FEM computations of complex structures and machines;
- tube-hydroforming (HOBU-Funds).

Physics

- optical characterization of solar cells (HOBU-Funds);
- signal generation and analysis with wavelets;
- spectral optical radiometric rneasurements (HOBU-Funds);
- colour measurements (HOBU-Funds);
- indicative and decorative lighting with LED's (HOBU-Funds).

Computer Science

- timetabling; automated support for flexible personnel scheduling;
- intelligent agents (HOBU-Funds);
- web applications, XML applications (HOBU-Funds);
- the semantic web (HOBU-Funds);
- ontology (HOBU-Funds);
- expert systems: decision support (CRAFT).

Electronics

- Electromagnetic Compatibility (EMC), Digital Signal Processing (DSP);
- micro controllers, chip design - VHDL;
- error correcting algorithms for wireless datacommunication;
- measurements on high frequency radio equipment.

Electrotechnical and Control Engineering

- light technology (in cooperation with group 'Physics');
- active (electrical) power filters;
- modelling of electrical power distribution lines;
- modelling and control in steel industry, pulp and paper industry;
- industrial IT;
- drive technology (torque, speed and position control).

Educational and Didactic Research

- investigations on organizational, pedagogical and technical problems during the integration of ICT in primary and secondary schools (Regional Expertise Network East-Flanders);
- investigations on the implementation of e-learning in higher education and in the training of employees in SME's and in enterprises (ESF-EQUAL- Innovatie Hoger Onderwijs);
- implementation of CD-ROM in language courses (LINGUA-D);
- development of Competence Assessment Tools (Leonardo da Vinci);
- research into the use of ICT in SME's (ESF - EQUAL - EFRO - INTERREG);
- research into advanced learning environments using communication and information tools (SOCRATES-MINERVA);
- the needs in TQM in education and industry (Leonardo da Vinci);
- the way to unified Europe (SOCRATES-GRUNTVIG);
- e-commerce competences and competence management in SME's (ESF - Equal).

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Katholieke Hogeschool Zuid-West-Vlaanderen

Organisation
The Katholieke Hogeschool Zuid-West-Vlaanderen (KATHO) is an institution of higher education with campuses in Kortrijk, Roeselare, Tielt and Torhout and since 2002 associated with K.U.Leuven.

Policy
Midway the nineties, a number of selected research activities have been started at KATHO, related to the fields of study in which KATHO is active. All research is implemented in the activities of KATHO and carried out within the framework of collaboration agreements with other organisations and companies. Below a survey is given of the most important domains of research.

Research Activities
Biotechnology

- *Molecular genetic tools in the pig production chain for the improvement of pork quality* The main purpose is to maintain the profitability of pig production in Flanders and to improve the quality of the final product by an integrated approach based on new technologies. In this research field molecular techniques are used in three domains:
  - development of genetic markers to assist selection of breeding animals;
  - identification, detection and typing of pathogen bacteria using molecular genetic tools;
  - influence of feed additives (i.e. prebiotics), as possible replacements of feed antibiotics, on the composition of the intestinal microflora[1].

Industrial Science and Technology

- *Non-contact ultrasonic testing, evaluation and imaging* Non-destructive inspection of materials by means of air-coupled ultrasound in the frequency range 0.5 - 5 MHz. Development of measuring and visualisation techniques with respect to materials of either low acoustic impedance (textiles, fibres, etc.), intermediate impedance (e.g. plastics) or high Z-materials such as metals (aluminium, steel,...) or composites[2].

Educational / Didactic Research

- *Problem-based learning with multimedia interaction cases in nursing and orthopaedagogy* Development of multimedia interactive cases for different target groups, such as students of regular training, students following alternative learning routes or professionals who want to refresh and update their knowledge and competencies. Implementation and evaluation of interactive CD-ROMs[3].
- *Multimedia interactive cases for a multiprofessional module for health care professions* Construction of cases in which students learn to communicate and collaborate with a multiprofessional team (physicians, nurses, kinesitherapists, psychologists and orthopedagogues) in order to ameliorate the quality of their interventions for the patient[3].
- *Development of programs concerning reading instruction* Purpose is the development of programs to teach pupils the basic decoding and spelling skills from the outset, such as
- the Direct System Method (DSM): a program for initial reading

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- the Reading Box: a computer program to analyse reading problems and remedial program[4].
- *Research in the field of spelling instruction* Purpose is the optimisation of spelling instruction in primary schools, such as the comparison of the effectiveness of reading and non-reading training tasks (like copying, problem naming and oral spelling) in learning to spell[4].
- *Research concerning learning disabilities in mathematics* Study of the learning disabilities with respect to mathematics and the relationship with remembering and reading disabilities[4].
- *Research concerning classroom management* Extensive study of patterns of classroom management skills, resulting into recommendations for the training of future teachers[4].
- *Exploration of the communicative possibilities of global simulation exercises* Purpose is the development of electronic simulation exercises in the field of language education (police novel and village)[4].

Social Sciences and Special Education

- *Applied Research in the Field of Social Work (welfare & social-cultural work), Psychology and Special Education*
  Some typical issues are:
  - inventory of youth care in Flanders;
  - integrated social welfare policy for cities;
  - inventory of accessibility to communication, information and buildings by disabled people;
  - needs assessment in the neighbourhood of a home for aged people;
  - measurement of the degree of satisfaction of aged people in a home;
  - needs assessment for day-care services in families with young children, ...[5].

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Provinciale Hogeschool Limburg

Organisation

The Provinciale Hogeschool Limburg (PHL) is located on three campuses of which two are located in Hasselt and one in Diepenbeek. The PHL has about 3,700 students distributed over 5 departments which cover the following study areas :

- health care: physiotherapy (2-cycle education) and nursing, midwifery, occupational therapy; besides the basic curriculum a number of post-studies are offered;
- commerce & management studies: accountancy-tax management, finance and insurance, international marketin, direct marketing and selling and buying management, logistics, expedition, distribution and transport, legal practice, environmental administration, medical management, translation and interpreting, applied information technology; also post-studies in tax management and special courses in ICT are being offered;
- architecture & arts: architecture and interior design, three-dimensional design, commercial art and graphic design, fine arts. All being 2-cycle education. This department includes the research cell on mobility studies;
- teacher training: secondary school teacher training;
- biotechnology is using a special campus site near Tongeren in collaboration with the provincial secondary school of agronomy where the PHL provides courses on classical agriculture, whereas on the site of the campus Diepenbeek the courses are focused on biotechnology.

Research Policy

The PHL has a specific commitment to perform applied research and to render services in order to spread know-how in health care and prevention as well as in technological and management techniques in an environment of small and medium sized businesses, multinational companies, hospitals or local administrations and governmental organisations. One of the main research activities in applied research focuses on transport and mobility, this is performed at the department of architecture, This type of research is mainly done for local administrations or to support governmental transport policies. A main topic in applied research is on educational level. This is mainly performed in collaboration with other institutes of higher education. Furthermore, it is a tradition within the PHL to offer seminars on the latest management techniques via the organisation of frequent lectures on Case Studies. The department of biotechnology, which has an extension that is situated in a more specific rural area, traditionally provides expertise and experimental data on field experiments for the local agricultural community. These services are provided in collaboration with different agronomic companies, local farmers. The results are widely spread through the organisation of frequent seminars. The recent introduction of the generalized use of laptops within the curriculum for all first year students has boasted the creation of an ICT-centre which provides internal as well as external support for the introduction of the latest ICT technologies.

Research Activities

Department of Architecture

- travel behavior studies in Brabant - control and supervision;
- travel behavior studies in Flemish-Brabant - analysis of traffic information in the urban areas of Leuven, Aalst, Mechelen and the surroundings of Brussels;
- travel behavior studies of business traffic;
- travel behavior studies - attitudes;
- travel behavior studies in Flanders and in Ghent;
- the fifth Framework Programme: Portal;
- traffic security - Agora;
- mobility in environmental agreements;
- school surroundings in Limburg;
- quality control in communal traffic policies;
- creation of a mobility center in Brussels;
- governmental transport policy - on infrastructure - on behavior - on local level;
- governmental transport policy - best performing countries;

- traffic policy in Brussels;
- basic mobility;
- localised criminal behavior;
- mobility profiles of persons;
- school surroundings in Brussels;
- railway network in Limburg;
- incoming main roads in Ghent;
- seminars on living above shops;
- the demarcation of urban areas in the province;
- the realization of supra local bicycle routes in Limburg;
- the analysis of traffic accidents in Limburg;
- the travel behavior in Antwerp;
- travel behavior in the urban area Hasselt - Genk.

Department of Health Care

- repetitive strain injuries in the workplace;
- job stress in the workplace;
- energy expenditure in human exercise;
- cardio respiratory rehabilitation childhood;
- prevalence of postnatal urinary deficiencies;
- physical activity in patients with psychopathological disorders;
- management of chronic pain;
- physical activity in children with developmental disorders;
- research on the knowledge of self-care within the group of pregnant women in Limburg.

Department of Biotechnology

- action plan on meat producing cattle in Limburg;
- experimental field experiments - to optimize culture technique in practical situations;
- implementation of herb culture in the biological and traditional agriculture;
- evaluation of the feasibility of the nitrogen norm within the MAPII-bis for farmers using a large part of organic fertilizers;
- demonstration of biological agriculture on loam soils in the South Limburg and Haspengouw region;
- realisation and testing of a prototype of two new mechanical techniques for weeding with perspectives for loam soils in the South Limburg and Haspengouw region.

The Department of Commerce & Management organises seminar cycles and workshops on 'case studies' in collaboration with the association of accountants and fiscal consultants of Limburg on topics concerning:

- social and labour juridical discussion points;
- updating of fiscal and legal aspects of company taxes;
- updating of fiscal and legal aspects of personal taxes;
- inheritance planning;
- franchising;
- consolidation in its new context;
- new laws concerning additional pensions.

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Nationaal Centrum voor Wetenschappelijk en Technisch Onderzoek der Cementnijverheid (OCCN) 109

Belgian Road Research Centre (BRRC)
Opzoekingscentrum voor de Wegenbouw (OCW) 111

Belgian Institute for Wood Technology (CTIB-TCHN)
Technisch Centrum der Houtnijverheid (TCHN) 113

Technical and Scientific Centre for the Brewing, the Malting and Related Industries (CBM)
Technisch en Wetenschappelijk Centrum voor de Brouwerij,
de Mouterij en Aanverwante Nijverheden (CBM) 114

Scientific & Technical Service Centre for the Belgian Textile Industry
Wetenschappelijk en Technisch Centrum van de Belgische Textielnijverheid (Centexbel) 115

WTCM-CRIF
Wetenschappelijk en Technisch Centrum van de Metaalverwerkende Nijverheid (WTCM-CRIF) 117

Belgian Building Research Institute (BBRI)
Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf (WTCB) 119

Scientific and Technological Research Centre for Diamond
Wetenschappelijk en Technisch Onderzoekscentrum voor Diamant (W.T.O.C.D.) 122

Belgian Welding Institute (BWI)

Belgisch Instituut voor Lastechniek (BIL)

Organisation
The Belgian Welding Institute (BWI) is a non-profit organisation which promotes the collective interest of companies, training and research centres, schools and persons engaged in the field of welding and joining materials. The member list is composed of manufacturers, suppliers, constructors, users, as well as training and research centres.

Policy
The BWI is an independent institution, with good accessibility, affordable and offering a clearly structured range of services such as consultancy, information, technology transfer, research and development, testing and training. Because of its size, it is flexible, fast and efficient.

Activities
The main activities of BWI consist of:
- consultancy and technology transfer;
- research and development;
- testing and failure investigations;
- information systems;
- standardisation and certification;
- education and training.

Strategic basic research A key aim of BWI is to enhance the competitiveness of its members and its core business is directed at achieving this aim. Its headquarters in Brussels provides a central location for training, conferences, seminars, workshops and meetings and this is augmented by its Research Centre attached to the Ghent University, where laboratory facilities exist for research, development, testing and failure investigation as well as demonstrations and training in welding and joining technology.
The BWI and its associated university facilities and expertise is a worldwide authority in such fields as brittle fracture, design, material selection, restlife determination and fatigue. It has undertaken many investigations for the petrochemical, process, refining, transmission, shipbuilding and offshore oil and gas industries for large and small organisations, where its expertise has contributed to reduced commercial risk and safer operation of structures and equipment.

Education and information BWI informs its members on the latest developments in the fields of welding, joining, materials, standards and research results by means of:
- publications and reports;
- seminars, workshops and symposia;
- welding magazine;
- teaching material;
- homepage on the Internet;
- technology consultancy service - welding technology.

BWI strives to achieve a uniform and harmonised European training structure. Companies wishing to fulfil the requirements of the European standards need welding(co-ordination) personnel with a proven capability.

BWI is actively involved in the training and qualification of welding personnel through the 'European Federation for Welding Joining and Cutting' (EWF) harmonised structure:
- European Welding Engineer;
- European Welding Technologist;
- European Welding Specialist.

BWI is active in the certification of personnel and enterprises through the 'Belgische Vereniging voor Lastechniek - Association Belge du Soudage' (BVL-ABS).

Technology transfer BWI co-ordinates and carries out research and development projects in its Research Centre. Its laboratories are well equipped for material investigation and for the execution of the conventional as well as special tests. Research and development are strategically important for companies wanting to meet the oncoming technological challenges and safeguard their future by innovation. The technology advisors come to the workshop at the request of the enterprise to solve the problems. In order to respond to specific and immediate needs, BWI offers a number of specialised services, helps you to innovate and can act as an intermediary on different networks to put you in touch with an expert when this cannot be dealt with directly by BWI.

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Belgian Ceramic Research Centre (BCRC)

Centrum voor Wetenschappelijk Onderzoek van de Belgische Keramische Nijverheid (CWOBKN)

Organisation

The Belgian Ceramic Research Centre (BCRC) is the Belgian collective research organisation for the ceramic industry. It was created by decree-law in 1948, in application of 'De Groote's law'. It aims to bring to the ceramic industry a scientific and technical support in all domains of interest of this industrial sector.

Policy

The activities of the centre are focused on three main directions:

- assistance to the industry (technology guidance, technology watch, standardisation, etc.);
- research;
- product certification, including factory inspection and test-laboratory activities.

To give a guarantee of quality of its services to the client, the BCRC is accredited as a laboratory (ISO 17025).

Activities

The main objective of BCRC is to help the industrial producers of ceramics in their development projects in the short, medium and long terms. The centre does not limit its action to producers; their activities are extended upstream by regular contacts with suppliers of equipment or raw materials, and downstream with the actual or potential users of ceramic products.

To carry its objectives through to a successful end the centre has set up different departments:

- tests: the laboratory has at its disposal experienced personnel and equipment allowing it to intervene in most of the problems related to materials and their development process. The environment unit in particular was very much appealed for in 2001 in brickyards, cement works... Moreover, in the engineering geology field, the scope of the centre also includes the mechanical resistance of soils and the sampling for performing analyses;
- technological assistance: the diverse help missions to companies are structured according to the needs of the latter (type of material or process, standards, etc.);
- research & development: the centre undertakes the development of products or industrial procedures in close collaboration with the companies concerned and conducts several research projects of a precompetitive nature (collective or prenormative) in order to reinforce the competitive position of the ceramic industry.

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Coatings Research Institute (CoRI)

Organisation
The Coatings Research Institute (CoRI) is a research institute founded in 1957. Today, it has acquired an international competence in science and technology of organic coatings. It has two divisions, one located in Brussels (head office) and one in Limelette (laboratories and all the other departments). It is financed by the industry (membership fees, collective and contract research, testing, analysis). Membership is open to any company worldwide.

Policy
CoRI is a private membership-based association dealing with developing and promoting technological innovations for the organic coatings sector. It participates in different research projects and technology transfer projects as part of European, national and regional programmes. It is active on international level. Its staff is regularly invited to present lectures at international congresses. The institute is also present worldwide at the most famous exhibitions and conferences for the paint industry. The modern equipment for testing and analysing organic coatings and the competence of the personnel makes CoRI a privileged partner for the industry.

Activities
Research is the driving force behind the development of CoRI.

- collective research: projects defined in collaboration with industrial members which are focused on themes which consider the whole paint industry. The aim is extending the basic knowledge on the properties of organic coatings and contribute to the development of new technologies. The research results are free for the members. An annual research report is published yearly (for members only);
- contractual research: private contracts can be concluded with companies in order to develop new products and technologies and optimise the existing products and technologies. The results are confidential and the property of the company;
- European Research programmes: these programmes are done in cooperation with other European companies and research institutes.

Technical assistance The aim is assisting companies on a practical level by solving their short-term problems by providing relevant information on raw materials, paint properties, application techniques, safety, environment and regulation issues. The technical assistance is especially dedicated for SME. Thanks to the cooperation with other institutes, CoRI can offer a real multisectorial approach for most of the industrial problems.

Analysis and testing A lot of chemical and physical analysis on paints, inks and raw materials can be realised in accordance with international standards. The laboratory is among others recognised for testing on coatings for concrete by the Ministry of Transport and Equipment, for testing on coated steel products (U-marking) by the Ministry Traffic and Infrastructure, for testing on coatings for aluminium and coated and anodized aluminium products (Qualicoat and Qualanod) by Estal.

Training Once a year a collective 3 days training 'Initiation in paint technology' is organised at CoRI. Tailor made training seminars on the most diverse aspects of coating service and technology are also organised all over the world.

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Belgian Research Centre of the Cement Industry (CRIC)

Nationaal Centrum voor Wetenschappelijk en Technisch Onderzoek der Cementnijverheid (OCCN)

Organisation

The Belgian Research Centre of the Cement Industry (CRIC) is the Belgian centre for collective research on cement and concrete, set up by application of the Act of the 30th of January 1947 (Royal Decree of the 11th of April 1959 published in the Belgian Official Journal of the 10th of March 1960). The CRIC originated from the wish to reactivate research within the industrial branches. Ever since its foundation, it has organized, coordinated and realized research in the building branch and more specifically in cement and concrete applications.

Policy

The tasks of the CRIC are:

- being a centre of competence for research, testing, expertise and analysis in the field of cement and its applications;
- being the certification body for concrete, masonry mortars and their constituents (cement, aggregates, admixtures, fly ash for concrete).

Activities

Programs focused on the environmental compatibility of concrete This research program aims at quantifying the leaching behaviour of concrete. The determination of the concentrations in heavy metals released during a static immersion test, with a periodic renewal of the leaching water, allows to quantify the lixiviated fraction, and so, to better determine the environmental impact of concrete.

Programs focused on the durability of concrete exposed to chemical environments

- prevention of the alkali-silica reaction (own research): this research program, funded by the cement industry, aims at determining the risk of developing an alkali-silica reaction in function of the constituents of concrete (cement and aggregates). The study should allow to define solutions, which allow to safely use potentially reactive aggregates in concrete compositions;
- European 'Partner' project: this European subsidised project, started on 1st March 2002 and running for four years, gathers 14 countries and 25 participants. The research aims at three main objectives: the edition of a petrographic atlas of the most common reactive European aggregates, the investigation of the discrimination power of the by Rilem TC ARP selected expansion methods together with field exposure test, and the assessment of the reliability of the expansion methods through statistical evaluation;
- Rilem TC ARP ('Alkali-Reactivity and Prevention: Specification, Assessment and Diagnosis'): the main objective of this Technical Committee is to attempt to select harmonised methods, acceptable on an international level, to allow the characterisation of the alkali-sensitivity of aggregates. Rilem work should build the bases for a European standardisation in the field of alkali-silica reaction;
- durable design of structures in reinforced or prestressed concrete: this research program, conducted in collaboration with the Belgian Building Research Institute (BBRI) aims at defining the specification of concrete in function of the durability (carbonation, chloride, acid). The results of this study should allow to define specifications that should better take into account the relation between performances and durability of the concrete. This should make it possible to complete the rules defined in the standards NBN-EN 206 and NBN-EN 15.002.

Programs focused on the optimisation of formulations for concrete

- optimal use of air entraining admixtures in concrete for roads*:* this research carried out in collaboration with the CRR is aimed to study the interactions between air entraining admixtures and cements of type CEM III, the effects of air entraining admixtures on the mechanical properties of concrete (bending strength) and the impact of air entraining admixtures on the durability of concrete in winter conditions (resistance to de-icing salts and to the freezing-thawing cycles);
- self-compacting concrete: integration in the building process: this research program is conducted in collaboration with the Belgian Building Research Institute (BBRI) and the Laboratory Magnel of the University of Ghent. It is focused on the optimisation of the mixing process, the forecast of the mechanical strength at young age and the study of the curing processes for the self-compacting concrete. CRIC is especially in charge of the study of the influence of the fillers and of the admixtures on the constants in the maturity functions used to forecast the mechanical strength at young age;
- participation to the French National project on self-compacting (SC) concrete: this project, initiated by the French 'Direction de la Recherche et des Affaires Scientifiques et Techniques' (DRAST), aims at drafting practical recommendations for the use and production of self-compacting concrete. The characterisation work concerns properties of fresh and hardened SC concretes.

Further References

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Belgian Road Research Centre (BRRC)

Opzoekingscentrum voor de Wegenbouw (OCW)

Organisation
The Belgian Road Research Centre (BRRC) is an applied scientific research institute created in 1952 at the request of the Federation of Belgian Road Contractors. It has about 100 members of personnel, with widely varying educational orientations, allowing to set up multidisciplinary teams as required by the problems to be dealt with. It is a meeting place for all those professionally concerned with roads: contractors, contract awarders, design engineers, industrial and educational circles. BRRC has a long tradition of bilateral and multilateral international cooperation (PIARC, OECD, RILEM, IRF, WIN, FEHRL, etc.).

Policy
The policy of BRRC is to support public authorities and private companies to find solutions for the design, construction and maintenance of an efficient high-quality road infrastructure under optimum economic conditions, as well as to the problems of safety, mobility and environment raised by modern road transport.

Activities
Applied research and development The research-development-application activities mainly cover the following aspects:

- design of bituminous surfacings and bituminous mixes with a higher resistance to rutting, such as porous asphalt and stone mastic asphalt (SMA);
- recycling of demolition materials from roads, use of industrial waste and by-products (rubber, cellulose, roofing in bituminous mixes);
- renovation of cracked surfacings by using interlayer systems to delay and slow the propagation of cracks;
- behaviour of pavement structure and surface characteristics under traffic;
- maintenance management system of secondary roads (VIAGERENDA);
- equipment for visual inspection of roads;
- pavement surveying methods: evenness, transverse profile, rutting, deflection, skid resistance;
- surface texture of road pavements;
- traffic characteristics, traffic countings, classification, static and dynamic axle loads;
- drainage, sewer systems, hydrometeorological measurements, sewer survey, sewer inspection with a video camera;
- air-entraining agents, frost-susceptibility of concrete;
- noise pollution;
- speed reducing devices;
- road markings, signing and safety on work areas;
- transport models for economic, environmental and safety assessments.

Standardisation is also a major concern, together with regulation and certification. BRRC develops products or services that can be proposed to the sector, e.g. a maintenance management system and a software for asphalt mix design, and carries out specific studies and tests, check tests and expert studies.

Assistance Besides Research & Development, BRRC carries out specific assistance for the benefit of road professionals, namely road contracting firms, national, regional and local public authorities, materials and equipment producers, control and certification institutes, educational institutes, design engineers, control and testing laboratories, etc. It can be technical, organisational or documentary assistance. Assistance concerns mainly design, construction, management, maintenance and operation of roads, airfield runways, engineering structures and road equipment. Environment, transport, mobility and road safety also get increasing attention. BRRC has developed two services called 'Technological Guidance', particularly intended for helping small and medium-sized enterprises. These services cover bituminous materials as well as cementitious and pozzolanic materials. BRRC has also been recognized by the Ministry of Public Works for carrying out about 300 contractual tests by application of official standards and legal or particular specifications.

Dissemination, training, knowledge transfer BRRC disseminates and applies the results of its research and the information at its disposal to the road sector. This activity takes the form of (training) courses, workshops, conferences, participations in exhibitions, numerous technical publications. Training actions undertaken by BRRC in close cooperation with public authorities, the private sector and educational institutions allow the continuous training of staff members from Belgium and abroad (both industrialised and developing countries).
BRRC is also the Belgian node of the World Interchange Network (WIN) for the exchange of road-related information worldwide and particularly for the benefit of developing countries.

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Belgian Institute for Wood Technology (CTIB-TCHN)

Technisch Centrum der Houtnijverheid (TCHN)

Organisation
The Belgian Institute for Wood Technology (CTIB-TCHN) is the centre for collective research of the wood industry. Its mission is to bring to the wood industry a scientific and technical support in all domains of interest to this industrial sector. It has been created 54 years ago.

Policy
The activity of the centre are focused on three main directions:

- assistance to the industry (technology and safety guidance, technology watch, standardization, etc.);
- research;
- product certification, including factory inspection and test-laboratory activities.
- The quantitative repartition of the activities is approximately equally distributed between those three directions. To give a guarantee of quality of it's services to the client, the CTIB-TCHN is accredited as a certification body (EN 45011), as an inspection body (EN 45004) and as a laboratory (EN 45001).

Activities
The assistance to the industry is a key-element of the activities of the CTIB-TCHN. The aim is to know 'everything' in 'all' the domains where the wood industry needs knowledge that it does not have. As example, let us cite wood technology, it's drying, its treatment and it's application (structures, wood based panels, doors and windows, flooring, furniture,...).

Already some years ago the product certification took a greater role for the industry. Nearly all wood-based products for the building industry are certified under a Belgian system and the CE-marking following the CPD (Construction Product Directive) is coming quickly. Other products are also certified as, for instance, baby beds and equipment of playing ground. The CTIB-TCHN is the only certifier of wood based construction product for Belgium. To be further active in this activity, the CTIB-TCHN is notified to the European Authority to certify and help the Belgian and European wood industry to place a CE-marking on its products.

Research is also a part of the original missions of the CTIB-TCHN and is still an important part of its activities. In the year 2001, the CTIB-TCHN closed with success a program of developing an industrially oriented drying press with microwave heating to produce small glued-laminated beams. The CTIB-TCHN is developing a user-friendly computation program for wood structures that will make it much easier for the civil engineer the calculation of wood structure. Many other, much smaller, research activities are also done, solving particular problems for one or another company.

All those activities are possible because of the existence at the CTIB-TCHN of a very well equipped laboratory for mechanical, physical and chemical analysis in relation with the use of wood.

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Technical and Scientific Centre for the Brewing, the Malting and Related Industries (CBM)

Technisch en Wetenschappelijk Centrum voor de Brouwerij, de Mouterij en Aanverwante Nijverheden (CBM)

Organisation

The Technical and Scientific Centre for the Brewing, the Malting and Related Industries (CBM) is the centre for collective research of the brewing, the malting and related industries. Its mission is to give a scientific and technical support in all domains of interest to these industries. It has been created in 1949.

Policy

Research is one of the original missions of the CBM and is still an important part of its activities. The assistance to the industry is a key element of the activities of the CBM. The aim is to know as much as possible in all the domains where the brewing, the malting and related industries are concerned. The centre has good contacts with the major universities in Belgium.

Activities

The activities of the centre are focused on 5 items :

- to give a stimulus to scientific and technical research with a view to:
  - support and strengthen the theoretical bases that rule the work in the brewery and the malting sector;
  - study the factors that can improve the quality and the effects of the different types of beer on the human organism;
  - the change for the better as far as the output and the quality of the production, the raw materials, the equipment in general in the brewing, malting and related industries are concerned;
  - the improvement and the development of the use of the products and by products of the brewing, the malting and the related industries such as yeast, spent grains, rootlets, carbonic acid, etc. in the interest of supplying the population.
- to assure a documentation and information task as far as the above mentioned items are concerned;
- to assure the official representation of the Belgian brewing and malting industries on international brewing congresses;
- to promote the improving of the analyses methods in the industrial laboratories;
- to contribute to the forming of the industrials.

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Scientific & Technical Service Centre for the Belgian Textile Industry

Wetenschappelijk en Technisch Centrum van de Belgische Textielnijverheid (Centexbel)

Organisation

For more than fifty years, the Scientific & Technical Service Centre for the Belgian Textile Industry (Centexbel) plays a decisive role in offering solutions to technical problems and in innovating products and processes within the Belgian textile industry. It has three divisions, located in Brussels (head office), Gent and Verviers (laboratories). Today, it has a staff of 115 highly skilled employees (58 scientific and 57 technical).
By Royal Decree of September 9th 1975, the statute of Centrum De Groote was granted to Centexbel. From this moment onward, all textile companies are solidary members of Centexbel. The Centre is committed to ensure the technological support of the entire textile branch.

Policy

Centexbel is a private membership-based association dealing with developing and promoting technological innovations for the textile and textile related sectors. As a market driven company, Centexbel offers efficient technological services to the textile industry and related companies while developing high tech knowledge thanks to a multidisciplinary approach and partnerships. The expertise of our motivated staff members in all fields of the textile industry, and the quality of their services reinforce the innovative and competitive power of our textile industries through product development and process innovation.

Activities

Technological services: customised advice and support By means of their own know-how and experience acquired over many years, and thanks to the cooperation with universities, other research centres and supplying companies nationally and abroad, Centexbel's technological consultants perfectly master the necessary broad expertise to provide customised advice and training to all textile companies. This assistance proves most useful in dealing with everyday problems, new developments, product specifications, standards and certificates, or innovations.

Measuring and testing: basic to quality and innovation Centexbel's accredited laboratories (Beltest EN 45001 standard) perform the whole range of textile tests. They offer a wide range of 700 different test methods, matching all textile products, from fibre to T-shirt or carpet. The testing of chemical, physical and microbiological properties and of the flame-retardancy of textile products offers an answer to divergent questions such as the prevention of allergens in children's clothing, the fire safety of carpets, the wear resistance of upholstery, the resistance of protective clothing against toxic substances and the protection offered by medical textiles against bacteria and viruses.

Process innovation and product development: the winning card for industrial expansion Professional contract research supports companies in the development of new products and the application of innovative processes. In the struggle of today's global market, companies simply have to innovate and react in a flexible way to rapidly changing circumstances in order to maintain their competitive position. Thanks to their yearlong experience in practically oriented textile research and its close relationships with the entire textile industry, Centexbel researchers are without doubt the ideal and best informed partners to guide and assist companies in their product development processes.

Be it the innovation of raw material processing, process control or assurance or the introduction of new techniques or instrumentation, Centexbel is always ready to support the industry's efforts by collaborative research projects with many partners or bilateral/private studies and analyses dedicated to the needs of a single company.

Quality and Environment Experienced consultants support textile companies in setting up quality assurance systems and provide advise on their rational use of raw materials, water and energy. The services offered are complying with the clients' and consumers' specifications for the quality of products and processes of textile companies. Because of the increasing international competition, this must be done against very sharp prices and according to a systematic approach leading to a balanced control of all processes and activities (product development, production, logistics, ...).

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WTCM-CRIF

Wetenschappelijk en Technisch Centrum van de Metaalverwerkende Nijverheid (WTCM-CRIF)

Organisation
Created in 1949, the WTCM-CRIF is the national, industrial collective research centre for the sectors metal products and plastics, mechanical and mechatronical engineering, electrical engineering, electronics and ICT, and automotive. Today, it has over 1,700 member-companies, mainly SMEs.

Policy
WTCM-CRIF was created in order to improve industrial competitivity by promoting technical progress and innovation within these sectors. The final aim is technology transfer to the member companies.

Activities
In order to fulfil his role, the WTCM-CRIF has been organised into centres of excellence for 12 different technologies in order to answer the needs of most sectors:

- methods and tools for product development;
- industrial organisation and production management;
- materials engineering;
- innovation in mechanical and electronic products;
- information and communication technology;
- assembly techniques;
- manufacturing techniques by removal of material;
- rapid prototyping;
- processing and recycling of plastic materials;
- surface treatments;
- dimensional measurement techniques;
- foundry techniques.

The WTCM-CRIF is set up in a number of sites: Brussels, Ghent, Heverlee, Diepenbeek, Liège-Seraing and Gosselies. Altogether, 140 specialist engineers and technical personnel are available for research and technical support.

WTCM-CRIF's role is divided into three main activities:

- creating awareness in the industrial sector about the most recent developments in materials and technology in the areas of product design and manufacturing, or enterprise organisation and communication;
- medium term technical support to the industrial sectors by means of applied technological research. The proposed research topics will deliver technical solutions directly applicable by the group of concerned enterprises. This research will, in general, be funded jointly via the membership fees contributed by the members of the WTCM-CRIF and by the Public Authorities. The results of such research will be the property of the collective group (collective research);
- direct short-term technical support provided to the enterprise, by drawing up and implementing specific projects intended either to resolve a problem, or to respond to a specific need of a company. In such cases, unless the innovative aspect of the development being studied justifies some participation by the Public Authorities, the project will be totally financed by the asking company who will own the obtained results.

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Belgian Building Research Institute (BBRI)

Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf (WTCB)

Organisation

The Belgian Building Research Institute (BBRI) is a private research institute founded in 1960 under impulse of the National Federation of Belgian Building Contractors in application of the so-called 'De Groote decree-law' of 1947. Specifically this decree-law named after the former Minster of Economic Affaires aimed at promoting applied research in industry in order to improve its competitiveness. In application of this law the statutory contributing members of BBRI are the more than 60,000 Belgian construction companies (general contractors, carpenters, glaziers, plumbers, roofers, floorers, plasterers, painters, etc.) most of which are SMEs.

Policy

According to its statutes BBRI has the following three main missions:

- perform scientific and technical research for the benefit of its members;
- supply technical information, assistance and consultancy to its members;
- contribute in general to innovation and development in the construction sector in particular by performing contract research upon request of the industry and the authorities.

To fulfil its mission BBRI pools on the expertise of some 200 highly skilled and motivated staff members with widely varying education, allowing as such to set up multidisciplinary teams as required by the problems to be dealt with.

Activities

Research programmes at BBRI are in general initiated and monitored by Technical Commissions bringing together all the relevant stakeholders, i.e. contractors, material producers, authorities, designers, architects, consultants, universities etc. Where necessary, research alliances are set up nationally and internationally with universities and other research centres. In addition to own industrial BBRI members contributions, research is supported by the European Commission, the Federal Ministry, the Communities and the Regions (Flanders, Wallonia, Brussels).

Research is concentrated on practical work yielding direct results for the members. The field of research activities is quite large and in fact touches upon all essential requirements for building works, i.e. mechanical resistance and stability, health and environment, safety in use, acoustics, energy economy and heat retention. Expertise is grouped in different research departments, divisions and laboratories covering aspects such as structural design, soil mechanics, execution techniques, construction materials, façade technology, environmental issues, renovation, recycling, technical equipment, automation, building physics, lighting, heating, internal climate, building chemistry and information and communication technologies. Almost all laboratories are BELTEST (ISO 17025) accredited and/or have been notified to the European Commission as test laboratories working in the framework of the construction products directive (89/106/CEE).

Information and technology transfer is another core activity of BBRI. Direct transfer from research results to practice is assured through individual contacts by a team of technological advisors who work in specific specialised niches, such as concrete repair, renovation, concrete technology, acoustics, glazing, window frames, heating,... Technical information notes elaborating on good practise, and a quarterly journal addressing ongoing research and evolutions in standardisation are highly valued standard publications of the institute which are made available to subscribing members either on paper or in electronic format. Over 200 conferences, seminars workshops and specific training session on specific topics are organised each year. Winter courses allow practitioners to invest in permanent professional education.
Problem solving advice and technical assistance to building contractors is assured by a dedicated team of specialists who are standby to deliver their expert view by phone/fax or during on site visits and in dedicated reports. This service which is restricted solely to members is not only a much appreciated service for the members but also an inspiring source for pinpointing research needs.

Development and innovation With the specific aim of developing new technologies and innovative products, contract research and approval services are offered by BBRI. BBRI is indeed one of the main partners in the Belgian approval body (UBAtc) and consequently also collaborates actively in the development of pan-European approval activities (UEAtc and EOTA). By closely following up the construction standardisation activities it is furthermore assured that the sector is kept up-to-date with the latest developments on a national (IBN), European (CEN) and even on an international level (ISO). Through the Belgian Construction Certification Association (BCCA), the BBRI aims at ensuring that high quality products are available on the construction market in Belgium. This implies that BBRI invests as well in the further development of the national quality marks (Benor and ATG), the mandatory European conformity marking (CE) and the European voluntary quality marking (Keymark).

Europeaan and international networking BBRI has been a founding member of the European Network of Building Research Institutes - ENBRI[1] and the European Council for Construction Research Development and Innovation - ECCREDI[2]. BBRI is in fact also running the executive secretariat for both associations.

- Further more BBRI is managing quite a number of European Thematic Networks such as:
  - PRESCO - European Network on Practical Recommendations for Sustainable Construction;
  - FIT - Fires in Tunnels Network[3];
  - E-CORE - European Construction Research network[4].

Next to this activity in networks, BBRI is at present as research partner in over 15 European funded research projects. All this assures that BBRI is in a good position to become an important player in the European Construction Research Area.

- International liaison is assured through amongst others:
  - the International Council for Research and Innovation in Building and Construction - CIB[5];
  - International Federation for Structural Concrete - FIP[6];
  - International Association for Building Materials and Structures - RILEM[7];
  - International Union of Building Centres - UICB[8].

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Scientific and Technological Research Centre for Diamond

Wetenschappelijk en Technisch Onderzoekscentrum voor Diamant (W.T.O.C.D.)

Organisation
The Scientific and Technological Research Centre for Diamond (W.T.O.C.D.) as a research centre was founded in 1977 to support the Belgian diamond industry. The research laboratory is based in Lier employing some 20 people covering the disciplines of mechanical engineering, electronics, computing, physics, geology and manufacturing. The centre is supported by the Belgian diamond industry itself through the Diamond High Council (Hoge Raad voor Diamant - HRD). The centre also attracts financial support for research projects from IWT. In addition funding is attracted from clients for doing individual work.

Policy
Its aim is to improve the competitive position of the Belgian diamond manufacturers by reviewing all aspects of gem diamond processing techniques including the measurement and optimisation of rough diamonds. This has resulted in a range of machines and systems introduced into the Belgian diamond industry. The activities have now expanded to cover scientific as well as engineering aspects of diamond research. In this way the growing demands of the industry can be met and Belgium as the world centre of the diamond industry is supported.

Activities
Over a period of more than twenty years a great deal of research and development has been done in the centre. A list of research topics resulting in successful products includes measuring and marking (Merlin), bruting (Superbruter), polishing (Octopus) and laser modelling (SOLID). Computer programs to calculate, evaluate and design diamond cuts are Brilliant, Quadarc and Excalibur. Current research topics include new laser and polishing techniques, transfer between measurement and processing platforms and 'in tang' angle measuring.

Information about developments in diamond processing technology can be obtained from the Technical Advice Department (TAD). In recent years the group has increased its knowledge base on Intellectual Property Rights and W.T.O.C.D. offers advice on patents to members of the Belgian diamond industry.

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