



Applied Engineering in Brussels

How the University Colleges of Brussels contribute to R&D



By InduTec



InduTec asbl - Technological Transfer Center

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INDUTEC, the Technology Transfer Centre for your Innovation (www.indutec.be)

InduTec is a dynamic Technology Transfer Centre whose mission is to enhance the exchange of technology and innovation between companies and industrial engineering faculties in the Brussels Region. By monitoring projects from concept to implementation, *InduTec* offers promotional opportunities and state-of-the-art experience to those faculties, and enables companies to reap the benefits of a quality science 'business incubator'.

A company's technological knowledge base is the foundation on which internal product and process innovations are generated. However, technological knowledge is not accumulated solely through internal learning processes. Increasingly, companies are turning to external sources in the technology supply chain to acquire the technological know-how they need to introduce product and process innovations. Thus, the successful structuring and executing of partnerships with external "technology source" organizations, such as the Technology Transfer Centre - *InduTec*, is often critical to competitive success in technologically dynamic environments.

The research activities of the industrial engineering faculties in the Brussels Region are future-oriented and innovative. The industrial engineering faculties collaborate with industrial and economic actors in Belgium and abroad through

- contract research (industrial research projects, technical feasibility studies, pre-competitive development, ...)
- economic valorisation (transferring R&D results through existing or new companies)
- protection of intellectual property, licencing agreements, spin-off guidance, ...

It all passes through *InduTec*, that knows how and where to find the appropriate competencies in the industrial engineering faculties to respond to the requests of industry.

If you are looking for new partnerships in managing your technological innovation, do not hesitate to contact our Technology Transfer Centre.

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■ Areas of Expertise

■ Agro-food technologies	52
■ Biotechnological Sciences	62
■ Electronics & ICT	72
■ Industrial Technologies & Material Technologies	81
■ Medicine & Human Health, Electromedical Equipment ...	88
■ Physical Sciences & Measurements	95
■ Protecting Man & Environment	100
■ Rational use of Energy	104
■ Transport Technologies	107





Areas of Expertise



Protecting Man & Environment



Every industrial activity has an environmental and health impact. In order to adhere to standards and legislation this impact should be minimized or avoided. In this context, the main focus of research at the institutes is essentially in the area of sustainable development and solutions for pollution problems and waste management (gases, liquids and solids) and purification of residual industrial effluent, mainly airborne Volatile Organic Compounds (VOCs). Emphasis has been put on techniques such as biofiltration, biopurification and bioencapsulation.

Other environmentally friendly activities include the design and development of energy-efficient electric drives and small combustion engines, studying the impact of biofuels on mechanical engines and the design and manufacturing of sustainable development concept cars.

Our institutes are able to offer consulting services to resolve industrial environmental pollution problems by implementing waste management techniques such as life-cycle analysis, multi-criteria analysis, specific solid waste management etc. Studying the variability of natural radioactivity in an urban environment is also undertaken in order to implement preventative solutions.

Specific training is provided for the protection of people in industrial environments.

The following research units are involved in Protecting Man and Environment activities:

- Electromechanical Unit, EHB - IWT
- Chemical Engineering Unit, HELDB - IM
- Industrial Chemistry and Environmental Unit, HEPHS - ISIB
- Nuclear Physics and Radiation Laboratory, HEPHS - ISIB
- Electrical & Automation Engineering Unit, HELDV - ECAM
- Mechanical Conception Laboratory, HELDV - ECAM
- Mechanical Engineering Unit, HEPHS - ISIB



RECENT RESEARCH PROJECTS

Biofuel

Abstract: An evaluation of the outlook for biofuel supplies in Belgium; biofuel properties and a study of the mechanical performance of engines based on the relative contents of biofuels/fossil fuels in the feed. The study will consider the addition of bioethanol in gasoline and the addition of biodiesel and vegetable oil in diesel fuel.

Scientists: B. Bottin (ISIB), G. Georges (ISIB), L. Hocks (ISIB).

Partners: PSA Citroën.

Technological Domain and keywords: biofuels, biodiesel, bioethanol.

ECO Shell Marathon

Abstract: The Shell Eco Marathon is an educational project that integrates sustainable development values with the concept of driving as far as possible using the least amount of energy. This project comprises the study, design and machining of high-precision mechanical parts for the assembly of an energy efficient concept car.

Scientists: R. Itterbeek (ECAM).

Partners: Institut Von Karman.

Technological Domain and Keywords: mechanics, aerodynamics, CAD/CAM, rational use of energy, transport technologies.

Natural radioactivity

in an urban environment - RADON

Abstract: A study of the variability of natural radioactivity in an urban environment to acquire more detailed knowledge of the natural baseline radioactive level in order to better evaluate any accidental contamination, and to identify any increases in radioactivity due to the use of naturally radioactive materials. The project includes the collection of data on radon pollution in buildings, the establishment of databases, risk mapping, a link with geology and an investigation of hot spots.

Scientists: F. Tondeur (ISIB), I. Gérardy (ISIB).

Partners: Université de Luxembourg, Physique, FPMs, ULB, Institut Scientifique de Santé Publique Louis Pasteur, ISIMs, ISIPH et est partiellement financé par la province du Brabant Wallon, Cera holding.

Technological Domain & Keywords: Radiation protection, Radioactivity.

Construction of mini purification plants for domestic wastewater

Abstract: A pilot study for the construction of autonomous purification units for domestic wastewater and continual analysis of effluent quality. The structural design of autonomous purification units for buildings not connected to the public drainage network is also considered.

Scientists: O. Janssens (ISIB), N. Jeurissen (ISIB), C. Licour (ISIB), L. Hocks (ISIB).

Partners: ISI Mons, Strater.

Technological Domain & Keywords: environmental engineering, measurement and detection of pollution, water pollution and treatment.

Diagnostic Study for the Promotion of a Sustainable Solid Waste Management Model in the Province of Sichuan, China

Abstract: To produce a solid waste management inventory in three Chinese cities: Chengdu, Luzhou and Yibin and to evaluate the best technology available to treat this waste, maximize waste collection and treatment facilities through multi-criteria analysis methods (Asia Pro Eco Project).

Scientists: L. Hocks (ISIB), P. Vanden Cruyce (ISIB).

Partners: Basque Cluster Association of Environment Industries (Spain - Bilbao), Administrative Centre for China's Agenda 21 (Beijing - China), South Centre for Environmentally Sound Technology Transfer (Chengdu - China).

Technological Domain & Keywords: measurement and detection of pollution, soil pollution, biotreatment and bioconversion, incineration and pyrolysis, land and sea disposal, recycling and recovery.



Areas of Expertise



Protecting Man & Environment

SPINBIOF

Abstract: The biofiltration of industrial gas effluent using controlled salting out. This project aims to enhance biofiltration and ensure high degradation rates by implementing an idea inspired by soil and water treatment (controlled salting out).

Scientists: X. Nicolay (IM), D. Ortolani (IM).

Partners: Sima-Saca Gheysen, ENVISAN International.

Technological Domain and keywords: environmental technologies, pollution management, (bio)polymers, biotechnology, biofiltration, VOC, continuous inoculation, controlled salting out.

CONSULTING SERVICES **& TRAINING**

PROTECTING THE ENVIRONMENT

- Analysis of Volatile Organic Compounds
- Continuous analysis of oxygen dissolved in effluent from purification plants
- Assessment of energy production from biomass and solid waste
- Life-cycle analysis and environmental management: quantification of material and energy flows in an industrial production unit in order to obtain ISO 14001 certification
- Multi-criteria analysis applied to environmental management: classification of a series of actions based on different environmental impact criteria
- The purification of residual industrial effluent; the treatment of airborne Volatile Organic Compounds (VOCs); the degradation of solvents and xenobiotics; the development of a biological treatment plant using biofiltration to maximise decontamination capabilities

PROTECTING MAN

- Sécurité RGIE BA4, BA5 - Training on the occupational and safety regulations regarding electrical installations (including guidelines for all users and employers involved in the electrical industry)
- Formation Complémentaire pour Conseillers en Prévention en Sécurité au Travail - Training for Health and Safety Advisers
- Training in radioprotection for paramedic professionals and experts (according to the Arrêté Royal/Koninklijk besluit of July 20, 2001 art 53.2 and 73.2)

SPECIALIST SOFTWARE

- Aspen Plus: A software package designed to allow an user to build a process model and then simulate the model without complex calculations
- Decision Lab: A multi-criteria decision support system based on multi-criteria decision aid methodology (PROMETHEE & GAIA)
- Eco Invent: Life cycle assessment software

SPECIALIST EQUIPMENTS

- Portable Gas Chromatograph for the VOC analysis
- High performance Liquid Chromatograph
- UV / Visible Spectrometer
- FTIR spectrometer
- RX spectrometer
- Electrochemical Measurement



PUBLICATIONS

Industrial and Environmental Chemistry Department (HEPHS - ISIB)

L. Hocks. "Greenhouse gas emissions in Europe and the Kyoto protocol". *The Challenge of EU Enlargement, (Leykam Ed, Austria), 2005.*

L. Hocks. "Solid Waste Engineering: comparison between waste landfill and waste incineration". *Report on Asia Pro Eco research program.*

P. Vanden Cruyce. "Promotion of a Sustainable Solid Waste Management Model in Sichuan Province. Application of multiple criteria decision making to evaluate and classify the processes for municipal solid waste treatments". *Report on Asia Pro Eco research program.*

L. Hocks. "Biofuels". *Indutec News 34, 3-5, (2006). L'ing 19-22, (Sept 2007).*

Nuclear Physics and radiation laboratory (HEPHS - ISIB)

F. Tondeur. "Mapping indoor radon in the Walloon region: kriging vs. moving average". *International 11th IAMG Annual Conference on Quantitative Geology from Multiple Sources. Liège, 3-8 Sep. 2006.*

F. Tondeur. "Geostatistical mapping of indoor radon data with kriging using geological data". *8th International Workshop on the Geological Aspects of Radon Risk Mapping, Prague, 26-30 Sep. 2006.*

C. Mertens, C. de Lellis, P. van Put and F. Tondeur. "MCNP Simulation and Spectrum Unfolding for an NaI Monitor of Radioactivity in Aquatic Systems". *10th International Symposium on Radiation Physics, Coimbra, 17-22 Sep. 2006.*

S. Gallardo, I. Gerardy, J. Rodenas, N. Rasson, M. Van Dycke and F. Tondeur. "Simulation of the dose distribution for a brachytherapy source of Ir-192 using the Monte Carlo method". *1st European workshop on Monte Carlo Treatment planning, Gent, 22-25 October 2006.*

Chemical Engineering Unit (HELDB - IM)

J. Marek, B. Massart, X. Nicolay, A. Robson and J-P. Simon. "Gel entrapped cells for waste gas biofiltration". *Med.Fac. Landbouw univ. Gent, 1999.*

N. Boulanger, V. Debois, A. Debourg, Ch. Dewilde, P. Ledent and L. Van Nedervele. "Biodegradation of fatty matters from wastewater treatment plants". *Cerevisia : Belgian Journal of Brewing and Biotechnology, 2002, 2, 84-89.*