BME Research University Strategy
Summary

Budapest, 2010

Extracts from the BME research university strategy

Publisher: Péceli Gábor rector
Editors: Kálmán Kovács, Sándor Tömösközi
Coordination: Györgyi Dallos, József Zoltai
DTP: Tamás Rumi
Photo: János Philip, József Tóth, László Szlancsik, faculties' archives

Address: H-1111 Budapest, Műegyetem rkp. 3., Hungary
Phone: +36-1-463-1669, +36-1-463-1595
www.bme.hu

This publication is sponsored by the project "Development of quality-oriented and harmonized R+D+I strategy and functional model at BME" (TÁMOP-4.2.1/B-09/1/KMR-2010-0002)
Budapest University of Technology and Economics

BME, how to proceed as research university?

Dear Reader,

This publication is addressed to those to whom the answer to the question raised by the title is not indifferent. The actuality of this question is due our decision to renew the professional life of our University within the framework of a comprehensive development programme. The purpose of this programme is to permanently meet the requirements of the research university title awarded to BME in April 2010, and supported also by a TÁMOP grant.
This renewal corresponds to our unique mission: the direct service of the competitiveness and sustainable development of our country is possible only in an outstandingly professional environment. As a research university, our primary task remains the provision of high level training of engineers capable of solving creative and innovative R&D problems, elaborating and implementing new products and to encourage entrepreneurship. This can be done only if we ourselves participate in high-level research programs regularly, and we earn even international recognition in some fields.
The long term programs to achieve this goals aim at the followings:

- Improvement of scientific productivity and creativity; development of the indispensable R&D infrastructure; improvement of the general conditions of RDI activities producing direct benefit for the society, and cooperating partners.
- Appropriately focused development of recognised, and from the viewpoint of competitiveness properly emphasized R&D fields.
- Nurturing and encouraging the care of talent and strengthening the education and the reinforcement of R&D specialists.
- From the viewpoint of the economy, measurable R&D activity; and the maintenance and expansion of partnerships.

For the first step in our comprehensive development program, we have identified five research areas then set out to elaborate their strategies. These are as follows:

- Sustainable energy
- Vehicle technology, transport and logistics
- Biotechnology, health and environment protection
- Nanophysics, nanotechnology and materials science
- Intelligent environment and e-technologies

As we are already in possession of the first documents related to these areas (see: http://www.bme.hu) we invite the Reader to contribute to our work by studying our preliminary ideas, and - as a next step - to participate in the development of our action plans. To help this process, this publication (1) summarizes the most important aims of the development program of our professional life; (2) introduces the strategy of the five priority areas; and (3) outlines the endeavours of the Faculties that will provide the basis for these developments.
Please also note that the renewal program, started in coincidence with the research university program, targets almost all activities of the University, not just solely research. We believe that by this approach we can fulfil our professionally unique mission.

17 November 2010, Budapest

Gábor Péceli
Rector

Basic Concept of the RDI Strategy

The RDI (RDI = Research, Development and Innovation) strategy of the University is based on the one hand on horizontal elements that support the operations of the whole institution, and on the other hand on the harmonisation of priority research areas that can equally concentrate profession specific and interdisciplinary resources.

1. Human Resources Development Strategy

Program for retaining and developing scientific performance/potential

- Retaining and developing of values, the culture of value creation: recognition of utilizable knowledge, innovation and industrial development, the creation of intellectual and material products.
- Appropriate professional leadership, the operation of professional communities/science schools: clarification of faculty and department competences, setting priorities, demanding project-like operation.
- Ensuring conditions for scholarly advancement: development of a lecturer and researcher career model program, and another program for retaining outstanding lecturers and researchers.
- Maintaining interest in results: Institutional and organisational unit level review of current researcher incentive systems, the regulation of intra-institutional utilization of research achievements: the development of support activities.
- Development of researcher mobility: university employment of industrial researchers-developers, invitation of notable persons working in related fields in other countries.

Complex program for the care of talent and reinforcement of R&D specialists

- Participation in broadening social knowledge and developing environmentally conscious thinking.
- Supporting the preparation and orientation of students who are looking at further education: the organization of professional competitions and the nurturing of talent.
- Ensuring the further development of talented students: improvements to working conditions and developing an understanding and appreciation of students' scholarly circle activities: organizing professional/schools competitions: strengthening the involvement of students into special courses and RDI activities
- Improvement of PhD education, the lecturer/researcher career model, preventing the best students and researchers at the university from changing careers: candidate and postdoctoral employment, transforming human resources policy to one that is quality driven.
- Involvement in student/researcher exchanges of experienced Ph.D. students in international research cooperation, organisation of international Ph.D. courses, improvements to student and researcher mobility by prioritizing motivations for returning.

2. Infrastructure Development

Program for research and development of infrastructure

Surveying existing tools and capabilities and organising the common use of them, harmonizing the development plans of the laboratories, improving central fund raising activities, the operation of a competence based and project oriented, dynamic organisational model.

Improvement of the general system of conditions for RDI activity

Improvement of university services: cutting administrative burdens, improving the information flow, supporting tender applications, fund raising and utilisation activities, devising a project management programme capable of managing industrial relations: protection and utilisation of intellectual property, advanced management systems.

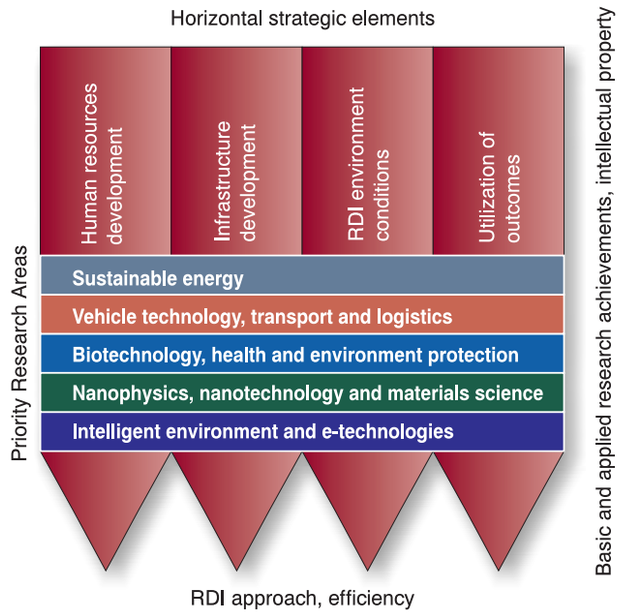
3. Utilisation Plan of Scientific Achievements

Development of various levels of research cooperation

- Maintaining and expanding strategic cooperation with domestic research facilities, university, academy, industrial and other research institutes, groups and alumni organizations.
- Strengthening domestic and international cooperation and industrial relations by improving the culture and efficiency of consortium and bilateral cooperation, by creating utilizable common knowledge and intellectual products.
- Establishment of domestic, regional and international institutional cooperation: strategic partnerships supporting technology and knowledge transfer.

Program for intellectual property management, utilization, technology transfer (TT) services

- Modernisation of relevant regulation and establishment of involvement. Using education, training from both internal and external expert services: minimizing the risks of application and reservation: supporting management decisions: establishing spin-off ventures.
- Domestic and international dissemination of achievements: RD activities of tools and innovation potential: communicating the achievements describing the efficiency of the activity.



Authors of the RDI strategy basic concept:

László Bacsa, Judit Borsa, Péter Bihari, Hassan Charaf, Gyula Gróf, Kálmán Kovács, János Kövesi, Antal Lovas, György Mihály, Gábor Péceli, György Pokol, András Salgó, Gábor Stépán, András Szarka, Sándor Tömösközi, János Vad, László Vajta, István Varga

Sustainable energy

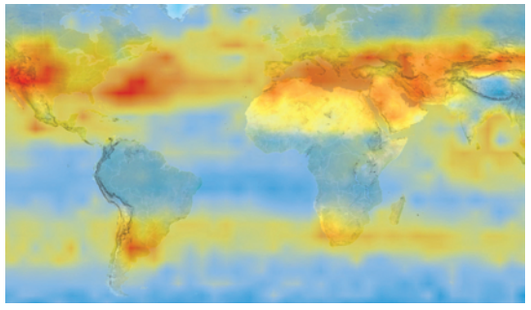
BME's mission is to contribute to energy challenges with effective solutions through its research programmes. Problems like the global increase of energy demand, the limited reserves of traditional oil and natural gas, the increase in emissions of 'greenhouse gases' as the cause of climate change, the destructive propensity of fluctuation in oil prices and the geopolitical instability of source regions justify the urge for finding and formulating solutions. The most crucial is to secure the sustainability of energy supply - its competitiveness, its security of supply, environmental and climate protection - in balance with the financial pressure imposed on society.

Strategic Objectives of the Research Activity
- Promotion of Information Exchange;
- Configuration of Technology Programs;
- More Efficient Preparation for Decision-making;
- Networking;
- Creation and Operation of Research - Inspired Networks.

While achieving strategic goals, BME is aspired to maintain its leader role as well as to strengthen cooperation with industry partners on RDI projects and to join the new Széchenyi Development Plan.

Competitiveness
The aim of the energy policy and energy research is to contribute to Hungary's growth of economic competitiveness in comparison with other EU member states and with the rest of the world.

Environment and Climate Protection
In relation to the environment and climate protection, energy policy and energy decision-making should focus on cutting CO_2 emission and keeping pollution level down. Researches should be directed toward the consistent evaluation system of various energy technologies and should favour technology implementations, which fall into the carbon neutral category, while imposing low level of pollutant emission on their local environment.



Supply Security
Supply security is a vital aspect of energy research strategy and of national energy policies. Research supports a structural formation of energy sources, in which the domestic sources remain (or increase if possible) and the content of import becomes more balanced, diverse in origin and comes form a secure source and location.

Research Organisation and Methodology
BME staff with expertise in energy research located across a range of departments form interdisciplinary groups, which is also supported by an innovative management structure.

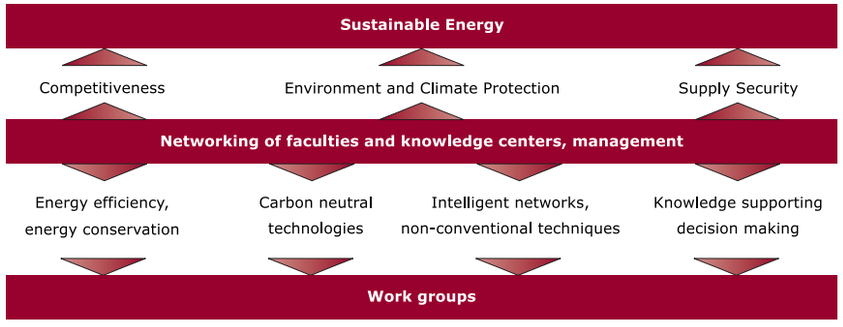
Implications and Suggestions
On the basis of research strategy goals, recommendations related to education and research are grouped into four priority areas:

Research
Current BME energy researches lay out the fundaments for the successful completion of the strategic objectives. The research fields and aims are the following:
Competitiveness. Contribution to a cost effective energy supply that reinforces sustainable development; increasing energy efficiency; developing a knowledge-base for energy policy
Environment and climate protection: Decreasing global and local pollutant emissions; carbon-free and carbonneutral electricity production and its system level support; cogeneration; increasing and complex utilization of renewable energy sources
Supply security: Safe nuclear energy; limitation of natural gas use; increased use of domestic fuels

Education
Research findings and experiences are constantly built in the education. MSc and PhD students progressively participate in university researches. Jointly with our industrial partners, we set-up and run a motivation programme in order to support the career growth of talented youth.

Knowledge transfer
Information exchange plays a vital role in the co-operation between the university and its industrial partners (multinational companies or Small and Medium size Enterprises (SMEs)). In relation to research, it is worthwhile to exploit the opportunities offered by the knowledge transfer infrastructure of the university and also to actively participate in further improving this system. Besides, the continuous development of cooperation among research facilities within the university is our priority.

Cooperation
We enlarge the cooperation with new partners and improve it among BME, other domestic and foreign research facilities (universities, research institutes) as well as national and international energy and energy policy organisations.



Comments on the Sustainable energy priority research area strategy paper - excerpts

'The paper dealing with research and development, and subsequent innovation areas - covering nearly the whole energy research area - is very detailed and precisely worded. The paper, building on the cornerstones of energy policy, considers modern priorities as sustainability and the protection of environment and climate. It provides a detailed analysis of the tasks before us, and seconds the ideas formulated and targeted in the New Széchenyi Plan.'

Mr. Ferenc Bohoczky (Ministry of National Development)

'Cooperation as close as possible with other universities is very important and should be supported, as well as the close research and development cooperation among the various faculties of the university, because the sustainable energy challenges before us are traditionally of interdisciplinary character (e.g. building energetics, energetics usage of biomasses).'

Mr. István Bakács (Scientific Society for Energetics)

'Present draft is a full-scale document with the appropriate depth, offering the founding for the given research area
The new Paks nuclear power plant first of all requires the adaptation of some or other knowledge, external know-how. Experiences with the building and operation of the Paks nuclear power plant prove that relevant scientific areas become extremely useful not only because of their originality, but because of their direct application. This makes this country a responsible, competent user of nuclear energetics.'

Mr. Tamás Katona (Paks Nuclear Power Plant)

'In general, it can be stated that the draft is based on correct foundations, the methods of analysis are appropriate, the final conclusions and the determined strategic goals are correct. The paper reflects grand and prudent work, successfully harmonizes the approaches of the different domains, nearly completely consistent overall. Its standard is worthy of the position earned by the University in energetics research, its content corresponds to the international standards of the domain.'

Mr. László Kiss (Univ. du Quebec a Chicoutimi, Canada)

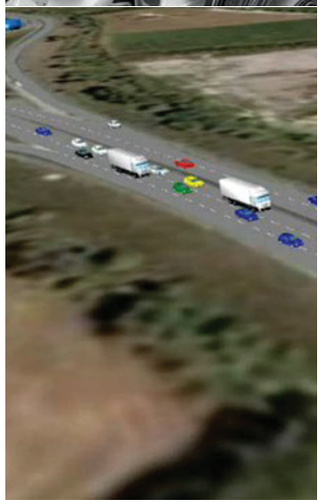
'The draft elaborated by a workgroup of lecturers from several faculties of the University covers all important areas of energetics. The approaches taken towards the key energetic branches are different, partially depending on differing opportunities, and fundamentals. The implementation of the strategy can only be successful and fruitful for national economy, provided that the relationships within the university and between the universities are supplemented by the relationships between the university and the practical users (those formulating the requirements)'

Mr. Károly Gerse (MVM Zrt)

Authors of the Sustainable energy priority research area strategy paper:

Attila Aszódi, Péter Bihari, András Dán, Gyula Gróf, Zoltán Hunyadi, Béla Janky, István Jóri J., Sándor Könczöl, Krisztián Samu, Máté Szieberth, Tibor Takács, Elek Tóth, Tamás Tóth, Ákos Török, István Vajda, Gábor Vámos, János Várfalvi

Vehicle technology, transport and logistics



Vehicle technology, transport and logistics (VTL), which also include shipping, are together the catalysts of a modern, global economy. Within the EU, these three domains produce nearly 15% of the total GDP and together they employ the highest number of people. In Hungary, the automotive industry is especially dominant as it provides 14% of the industrial output and 25% of the total export. One in seven employees receives a wage from the vehicle manufacturing, transport and shipping (logistics) industries and between one third and one half of the cost of any product is determined by logistics related costs.

Currently, BME is capable of providing integrated solutions to complex RD problems in the VTL area, even though synergic opportunities have only been partially exploited. However, sustainable development of the economy generates a number of challenges that creates continuous research requirements in the VTL area. We intend to develop a number of research strategies by building on the current strengths of the VTL domain which will enable us to satisfy these research requirements at a higher level.

Keeping in mind transport policy considerations and following comprehensive research derived from best international practices, we wish to achieve improvement in the following areas:

- Vehicle technologies by improving energy efficiency and minimising environmental load
- Intelligent vehicle technologies
- Intelligent transport systems
- Efficient transport operation and management systems
- Integrated logistics systems
- Management systems

With regard to developments in the field of human resources, as a general rule the development of quantitative human resources in the logistics domain of the VTL research area is essential, where retention of the existing capacities is justified. The development of quality management is equally important in all three domains. Beyond this, replacement opportunities should be examined and suitable researchers promoted to leadership roles.

As regards research infrastructure, the tooling requirements for the VTL area are not homogenous. In the vehicle technology domain, the modernization of existing laboratory facilities is a fundamental requirement. In the transport areas, quantitative development is needed on the technological side as well. Finally, it is logistics where laboratory development is most acutely needed, both quantitatively and qualitatively.

For a better utilization of VTL scientific achievements, it is important that BME's knowledge is kept up-to-date about the results and applications of the rapidly developing automotive industry, transport and logistics technologies and leadership-management methods, thus enabling BME to react rapidly and to be able to find solutions to technical, operational and management problems that may occur. Many potential clients are not, or are only partially aware of modern solutions and procedures. This may mean that proactivity may result in new RD tasks for BME.

As regards the industrial sphere, the primary task will be to keep up the existing relations. In the domain of logistics, expansion is the most essential need. Strategic partnerships and long term agreements should be sought with key clients. Proactive, supportive attitudes towards government and public administration representatives should be the norm.

There are various financial resources for the development of research. International tenders may indirectly contribute to the development of such innovation potential and resources. Here we should underline the RD Framework programme and other research programmes of the EU. The relevant domestic programmes specifically call for supporting the development of RD potential. Funding can be secured for laboratory development and temporary employment of researcher replacement. Within the framework of thematic calls which relate to the above themes, researcher wages, related material costs, and procurement are possible items. The most elastic use of funding arises from the completion of outside orders. For the time being, RD development funding from the central budget should not be included in this equation.
The execution of the VTL strategy should be systematically monitored. Operative tools of monitoring are the indicators measuring progress. Target values should be analysed annually and at this point the VTL project leadership should assess the results. In case of deviation from projected figures, the reasons for such deviance(s) should be examined and corrective interventions determined. Besides these indicators, VTL RD trends should be regularly monitored to facilitate rapid responses to any changes.

Comments on the Vehicle technology, transport and logistics priority research area strategy paper - excerpts

'Cooperation with research work into social sciences could receive a more significant role than outlined here; it would still keep the theme within the university, while taking a bolder step outside the applied technological-economic approach.'

Dr. Fleischer, Tamás, senior research fellow
(Institute for World Economics of the Hungarian Academy of Sciences)

'The professional activity of BME is truly outstanding in the research areas, too. In my view, the University should maintain this position in the future.' ... 'Participating in joint projects and close research cooperation with foreign institutions assist the University both in the research and in the education field to maintain its forefront position in the area of transport.'

Kazatsay, Zoltán, Deputy Director General
European Commission, Directorate-General for Mobility and Transport

'In my view the Research University Strategy does not deal with the entire education but only with research areas where BME intends to attain and maintain the state of the art. However, at the majority of researches not only the number of publications, but the latest industrial applications are also definitive.'

Lepsényi, István, CEO
Knorr-Bremse Fékrendszerek Kft.

'It is of international relevance to link the objectives of VTL on a professional-political level to the European Union innovation strategy published under the title 'Innovation Union' by the European Commission in October 2010. Innovation Union is a key element of the 'EU2020' economic and social development program of the second Barroso Commission.'

Dr. Siegler, András, Director
European Commission, Directorate-General for Research, Directorate Transport

'It is apparent that one key element to maintain/improve the position of the EU in global competition is innovation, within that RD, and mapping this principle in domestic strategies and in plans of institutions should be done in a coherent way. The reviewed draft does justice to this approach outstandlingly.'

Szűcs, Lajos, Head of Department
Ministry of National Development

Authors of the Vehicle technology, transport and logistics priority research area strategy paper:

Árpád Barsi, Gábor Bohács, József Bokor, Zoltán Bokor, Krisztián Bóna, Csaba Csiszár, Béla Kulcsár, Péter Mándoki, Ferenc Mészáros, Dóra Meyer, Huba Németh, László Palkovics, Ferenc Pápai, Tamás Péter, József Rohács, József Topár, István Varga, Rolland Vida

Biotechnology, health and environmental protection

Indisputably, biotechnology stands out as one of the most dynamically developing sciences of the 21st century. What is in the background of this dynamism? Industrial development provides for the increasing level in our quality of life. However, we can only enjoy the opportunities offered by these technological achievements if our state of health is at the highest possible level.

Biotechnology, together with its related partner areas (health and environmental protection), is also destined to satisfying this need as far as it is possible for it to do so. How?

1. In the area of prevention, it can ensure:
- that everyone is able to obtain the most appropriate and safe food products (personalised diet, food safety) for their needs
- that everyone has an appropriate amount of food raw materials at their disposal as their needs dictate (agricultural biotechnology)
- a healthy environment with the production of products adopting the use of environmentally friendly technologies (green chemistry), the utilization of by-products and the disposal of byproduct pollutants (environmental biotechnology);

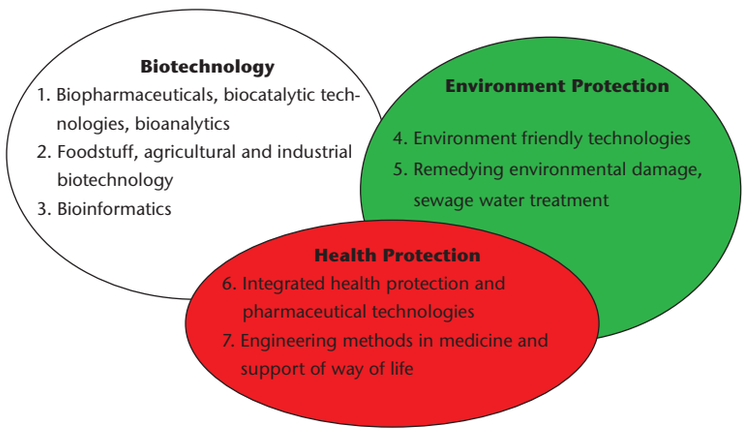
2. The earliest, effective diagnostics of diseases and personalised therapy following precise diagnostics. This is inconceivable without:
- selective, sensitive, high throughput analytical and diagnostic imaging procedures
- the efficient processing of results (bioinformatics)
- the prediction and knowledge of targeted pharmaceutical molecules, the target site of agents
- the efficient synthesis and biotechnological production of molecules (industrial biotechnology)
- the efficient apportion and formulation of molecules (nanobiotechnology);
- the aid of instruments and infocommunication tools supporting the home care of the elderly people with a poor health status.

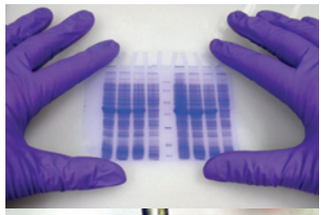
Taking all this into consideration, it is not surprising that the biotechnology sector - which fortunately includes the Hungarian biotechnology sector - has experienced explosive development in the past two decades. It is safe to say that biotechnology may very well be a potentially major breakthrough point for Hungarian industry. This fast paced development exerts its influence on Hungarian technological tertiary education in at least two ways. The need arises for:
- centres cooperating with industry to satisfy the basic and applied research needs of those industries;
- the education of an increasing number of experts

The research groups of the University involved in scientific, basic and applied research cover nearly the entire spectrum of biotechnologies listed above. Thus these may provide a good starting point for a university research network dealing with biotechnology, health and environment protection where research groups, by cooperating and undertaking complementary efforts in synergic effect, may contribute to the development of the domain with more efficient, higher levels of research, whilst training groups of specialists with higher levels of knowledge and with a view on related domains.

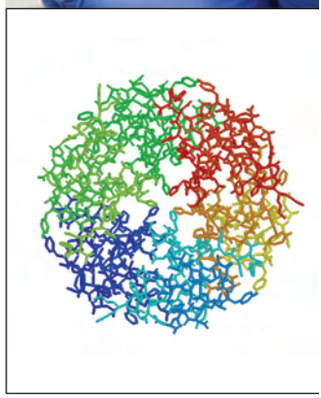
Accordingly, the research (university) program of BME which commenced in 2010 in the biotechnology, health and environment protection areas consists of the following prominent elements:

- The biotechnology research of the University now focuses on research areas that are current and that will point the way to the future. As a result of these developments, molecular biology, biotechnology rank amongst the University research and education key directions. Consequently, the theoretical support of the applied areas are strengthened, the efficacy of developments is expected to increase.
- By harmonizing university researches, the number of overlapping researches decreases and the number of complementary and vertical researches increases. New co-operations are formed among the research groups of the University whilst existing ones are strengthened.
- Core facilities are created where high levels of special knowledge and infrastructure concentrate. For example, the new molecular biology laboratory helps by covering the needs of research and by the funding of the University in this area.
- In the future, we need to give priority to establishing and maintaining domestic and foreign relationships. We regard the partner research groups such as MTA Szegedi Biológiai Központ (MTA Biological Research Center, Szeged), MTA Mezőgazdasági Kutatóintézet (MTA Agricultural Research Institute), Semmelweis University, Eötvös Lóránd University, and Corvinus University, as key domestic cooperating partners.
- We place emphasis on transferring procedures developed at, or with, the participation of the University to industrial applications. Therefore, we are endeavouring to form close cooperation with large industrial companies and small and medium size companies in these areas.
- Education can never take a subordinate role at a research university. This is why we make efforts to continuously introduce modern technologies and procedures to education, and to involve theme laboratory and students' scholarly circle students in the research.
- In educating the specialists of the future, we also assign an important role to the acquirement of appropriate practical (industrial) experience.









Comments on the Biotechnology, health and environment protection priority research area strategy paper - excerpts

'The draft is a good compromise considering the internationally relevant innovation strategy and the realistic conditions of BME, as the intellectual potential of the research university is capable of satisfying the high level international research challenges.'

Bedő, Zoltán, ordinary member of Hungarian Academy of Sciences, director,
HAS Agricultural Research Institute

'The research university title comes not only with benefits but also with obligations, which is eloquently proven by the received research plan paper. Worthy of the authors, the paper includes an adequately organized and easily readable enumeration of ideas that may serve in short, medium and long term the realization of quality higher education and high level scientific work'.

Greiner, István, director,
Richter Gedeon Nyrt.

'BME's Biotechnology, health and environment protection strategic research plan is timely and important. BME can easily be a natural home of biotechnological developments, as both its history and current position entitle the University to be so.'

Bánhegyi, Gábor, professor,
Semmelweis University

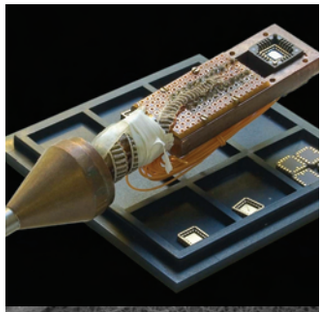
'Certain areas - primarily health industry - mentioned in the strategy are key elements, priorities of the current government strategy. There is a significant need that technology higher education should both quantitatively and qualitatively play a significant role in these areas, therefore the role of BME is essential.'

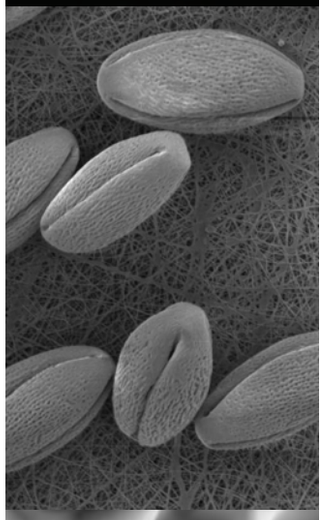
Mandl, József, Member of the Hungarian Academy of Sciences,
director of institute, professor, secretary of NEFMI Health Science Board

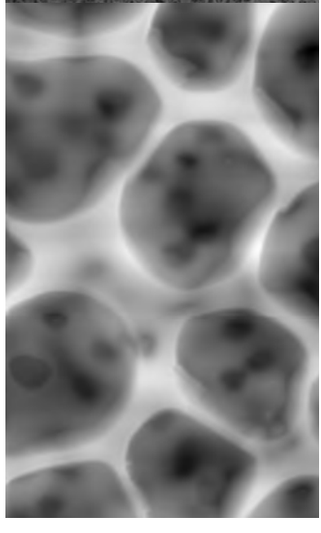
Authors of the Biotechnology, health and environment protection priority research area strategy paper:

Péter Antal, Ákos Jobbágy, Andrea Jobbágy, György Keglevich, György Marosi, András Salgó, András Szarka, Sándor Tömösközi

Nanophysics, nanotechnology and materials science







Nanotechnology exploits material properties which are markedly different from the behavior observed on macroscopic as well as on molecular scales as explored by chemistry and atomic physics. In the 10-100 nm submicron regime new phenomena emerge opening new, so far hardly accessible routes to the design and fabrication of nanodevices with novel functionalities as well as to the engineering of individual material parameters.
The utilization of nanotechnology in electronics, optics and computation has brought an exploding development to these fields while its share is rapidly increasing also in medical and environmental sciences as well as in energetics. Its impact is naturally emerging in the manufacturing of high intellectual added value products and, at the same time, it can stimulate a breakthrough also in mass production. By bringing the internationally well recognized research activities in natural sciences and the long-standing tradition in technological developments at the BME together we focus on the following three areas:

- In the area of *nanoelectronics* we aim at the fabrication, experimental and theoretical studies of novel nanodevices which provide both a challenge in basic research in terms of the understanding of new phenomena replacing the macroscopic properties and promising possibilities in potential applications in electronics. Beside the routine application of up-to-date nanotechnological processes we also plan to develop fabrication methods for special purposes including binding molecules to atomic chains or self-assembly of various nanostructures. The highlighted research areas are graphene based circuits, spintronics and molecular electronics.

- Our research in *surface nanostructures* focuses on the development and qualification of novel surface treatment and coating methods. The planned surface analytical, thin layer growth and electron beam lithography facilities provide a firm background for the fabrication and measurement of the nanostructures studied in the framework of the project. We investigate the possibilities of the potential applications in a wide range from solar cells and chemical sensors to medical instruments. Our further goal is the development of non-invasive nanostructure qualifying methods and setups with broad prospects of potential applications.

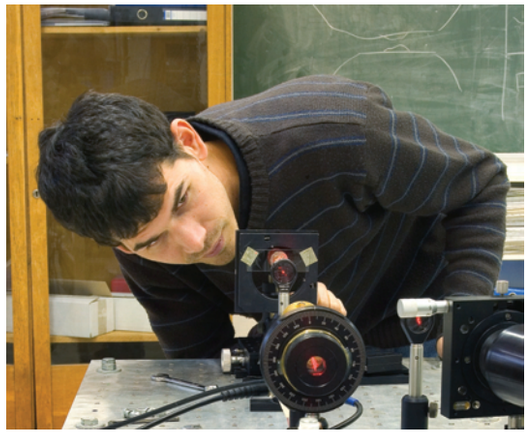
- In the area of the *structural and functional materials* we plan to utilize the favorable properties of nanoparticles for special purposes and to study the so-called active nanostructures including bio-sensors and bio-compatible nanostructures designed to carry targeted pharmaceuticals. The latter require a careful design based on the detailed knowledge of their nanoscale processes followed by a bottom-up functionalization.

The infrastructural background of the above research activities is provided by the BME Laboratory Network (http://nano.bme.hu) where major developments in the instrumentation funded on the basis of recently awarded grant applications are underway. A long-term objective is the establishment of a joint central nanotechnology laboratory in Building Q2 operated in liaison with the Hungarian Academy of Sciences' Institutes.

The intellectual background is based on the internationally recognized and renowned researchers of the University including those talented young colleagues who work as supervisors at various research fields. The involved undergraduate and graduate students as well as the doctoral candidates also play a significant role in research. Based on the concentrated project resources, we plan to provide a 'start up' support to retain pre-eminent young researchers in the country and to encourage and facilitate the return of researchers with outstanding success gained during their foreign postdoctoral period.

The utilization of the novel achievements in nanotechnology may provide revolutionary solutions also for various current economical challenges. The introduction of modern solutions may guarantee the competitiveness and market expansion of small and medium size enterprises. Multinational companies applying state-of-the-art nanotechnology solutions are already present in Hungary and they need highly qualified professionals. Collaborations with industrial partners are indicative of setting up the training and research profiles and are decisive in the industrial utilization of the nanotechnology research outcomes.

Innovation results can also be utilized in spin-off ventures closely related to the University. The primary task of these enterprises is to market the research results achieved at the University and to set up their independent profile after a period of incubation. International examples demonstrate that the research area of 'Nanophysics, nanotechnology and materials science' provides an optimal background for the foundation of such spin-off ventures.



Comments on the Nanophysics, nanotechnology and materials science priority research area strategy paper - excerpts

'The objective and the required resources are well formulated and useful. The dilemma is how to ensure the successful involvement of domestic small and medium size enterprises. This requires a partnership of those 20-30 ambitious companies talented in innovation that - with strong government trust in their background - would be able to provide a market for taking up nanotechnology developments.'

Karsai, Béla, president
Karsai Műanyagtechnikai Holding Zrt., Székesfehérvár

'It is important to note that besides direct industrial utilization, the results in nanophysics exert significant effects in the areas of energetics, biology, medical sciences and pharmaceutical development. This indicates that the achievements here not always appear in today's narrowly defined "technical" area. The significance of nanophysics crosses the disciplinary borders between physics, chemistry and biology.'

Pálinkás, József, President of the Hungarian Academy of Sciences,
professor, University of Debrecen

'The Intellectual potential is present in the areas related to the strategic plan on an internationally competitive level. The situation concerning the instrumental and project financing background is, however, not as favourable. A prominent element of the successful implementation is the establishment of a national nanotechnology laboratory which could also be embedded in a regional European cooperation network.'

Prof. Vancsó, Gyula, external member of the Hungarian Academy of Sciences
University of Twente, Netherlands

'The Plan relies heavily on cooperation, and justly so. However, it must be recognized that cooperation is difficult to initiate and maintain without the right conditions. A step in this direction is the already existing "Nanotechnology Laboratory Network" for sharing equipment. Hopefully, the planned Q2 building will be completed in a timely manner enabling all 'nano' activities to be housed under one roof.'

Prof. Springer György, external member of the Hungarian Academy of Sciences
Stanford University, USA

Authors of the Nanophysics, nanotechnology and materials science priority research area strategy paper:

Tibor Czigány, János Dobránszky, Róbert Gyurcsányi, Gábor Harsányi, Zoltán Hórvölgyi, László Kocsányi, György Mihály, János Mizsei

Intelligent environment and e-technologies

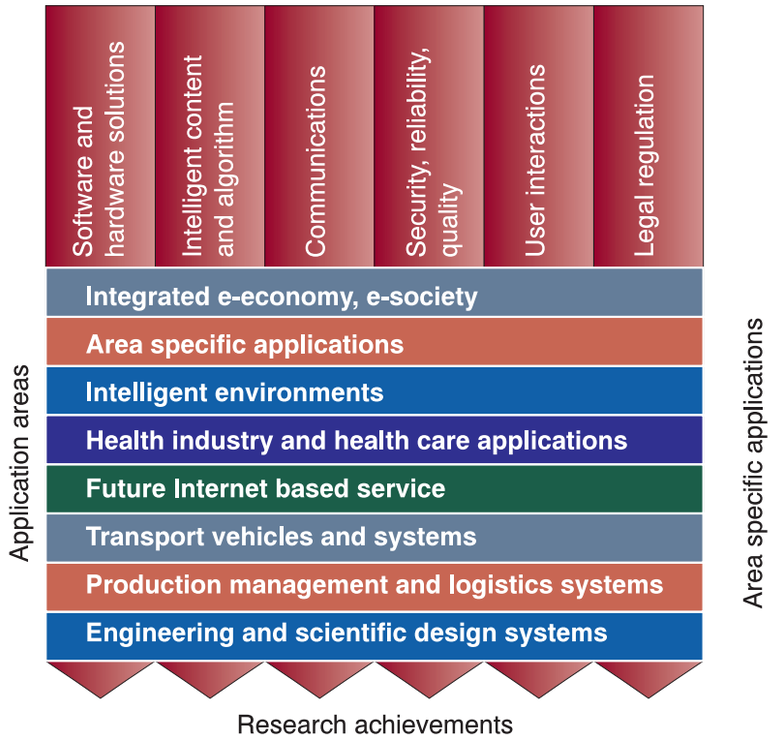
A key role is assigned to information and communications technologies (ICT) in the implementation of the strategic plans of European Union Member States and in the enhancement of the E.U. world market competitiveness. Because of its importance, recent years have seen a host of analyses in this area at both European and national levels. Research and development achievements in the ICT area have fundamentally determined the global technological development supporting the development of world economy; within that the competitiveness of the domestic industry and its development options.

Our daily activities are increasingly supported and monitored by intelligent environments and e-technologies in which software and intelligent signal processing, data management and planning systems in the form of software, play dominant roles. The research activity of intelligent environments and e-technologies is directed towards areas where large distribution systems, consisting of a host of intelligent services, millions of computers and data collection points, will form the basic infrastructure of the knowledge based society, economy and service systems in the foreseeable future. Embedded intelligence is capable of contributing decisively to every facet of life, from a minor investment to the wider efficiency of the operations of society, its production and service processes. ICT, besides its role as an independent branch, has an importance bearing on the improvement of the efficiency and the enhancement of competitiveness of other industries. The dual role of ICT can be observed in the wide technology, economy and science profile of BME.

Case Study

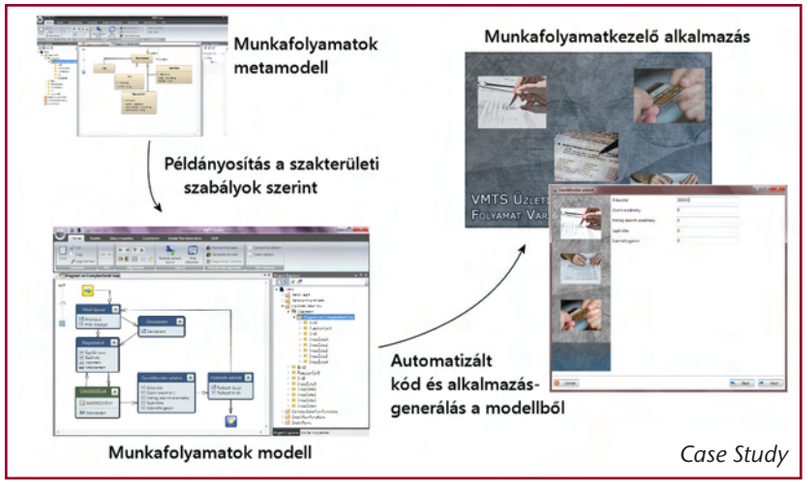
While BME is undoubtedly a leading influential institute in Hungary in the areas of basic and applied technology/scientific research, its unique opportunity and responsibility lies in that it is capable of cultivating complex and interdisciplinary research areas with the aid of the competence synergy of its faculties. This would be difficult if not impossible at all in other smaller institutions. Therefore BME aims to deliberately strengthen these areas and - in complement with its own capacities - to also become the centre of national and international cooperative researches. In concordance with this aim, the BME ICT strategy - taking in consideration international trends and domestic development guidelines - targets the cultivation of those areas where BME already possesses significant research achievements in certain and more specific domains. Building on this, the University intends further to develop and strengthen the cooperation of its faculties and research groups with the aim of achieving significant results in the future. By the deliberate development of these activities, the University becomes capable of joining more intensive international research networks, whilst at the same time satisfying domestic and special development needs to support the development strategies of the Government.

In the spirit of the above, we have divided our ICT strategy in two major parts: (1) basic technologies, and (2) application oriented research directions (those that pose research and development challenges to the whole of the University). The diagram below illustrates the structure of this strategy:



The strategic plan reflects the wide and rich spectrum of BME. In order to implement these strategic directions, action plans have been prepared which place thematic concentration at the forefront; the focusing of individual strategic directions along defined objectives in which BME can play an important national role in the economy as regards the creation of knowledge transfer, sample applications and the involvement of small and medium size enterprises (SMEs). This strategy can only properly fulfil its role if it is followed by a well-defined action program. In order to implement the principles and directions outlined in the strategy, as the first phase of the action program, we have defined six projects.

ICT SME	Efficient software and hardware solutions
	Future network solutions
	E-economy and e-society
	Efficient man-machine interaction
	Intelligent machine and physical world
	Intelligent ICT applications



Comments on the Intelligent environment and e-technologies priority research area strategy paper - excerpts

'The greatest value of this strategic document is that, based on a correct assessment of the situation of our country, by defining the RDI strategy, it gives equal weight to application oriented research and the research of basic technologies. Beyond this, it is rather fortunate that the most renowned Hungarian ICT research facility, by its own consideration, aims at the research and development of application areas considerably similar to those in the RDI strategy formulated as part of the government's economic policy'.

Simonyi, Ákos,
advisor to the minister of Public Administration and Justice

'It is of essential national interest that the achievements of research workshops are utilized by industry in the widest possible range. Professional and social feedback related to scientific and user values is provided for by consultations planned with the Hungarian Academy of Sciences, and the Informatikai Vállalkozások Szövetsége (Alliance of ICT Enterprises, IVSZ) and other professional organisations.'

Laufer, Tamás
IVSZ president

Authors of the Intelligent environment and e-technologies priority research area strategy paper:

Árpád Barsi, Hassan Charaf, Béla Fehér, Jenő Hetthéssy, Sándor Imre, Mihály Kállay, László Kocsányi, Károly Kondorosi, László Monostori, András Pataricza, Géza Szabó, Mihály Szoboszlai, János Verebics

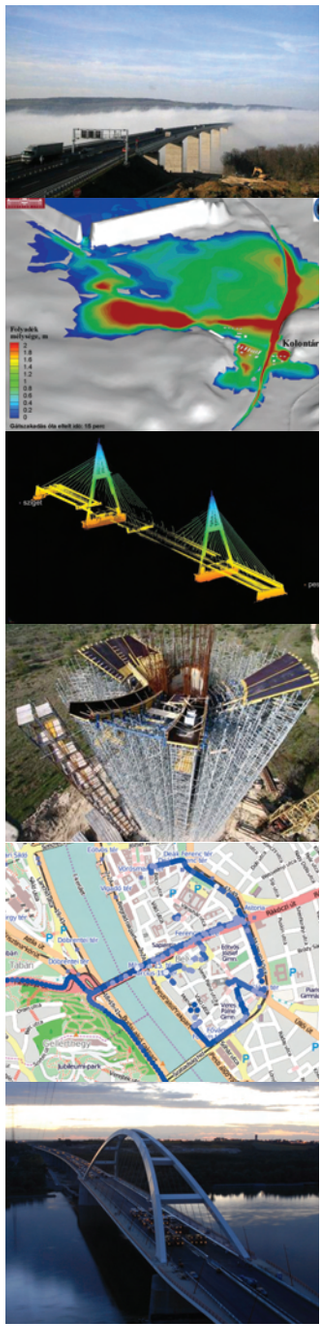
Faculty of Civil Engineering (1782)

Antal Lovas
Dean

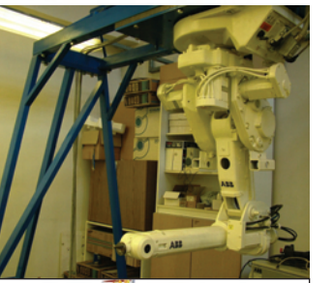
The Faculty of Civil Engineering, as the founding faculty of the University, determines the educational methodology of the civil engineer for the entire country. Amongst the six places where civil engineering is taught, this is the largest Faculty (every second civil engineer graduates here) and the only one where the full scope of training can be found. The three branches of the BSc courses can then be continued by master courses in Structural Engineering, Infrastructure Engineering and Geodesy and Geoinformatics Engineering.

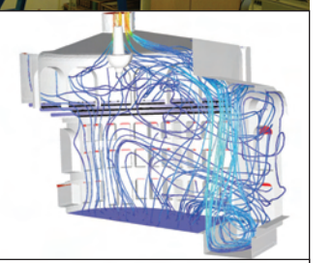
The Faculty participates in the following four projects of BME's research university programme:

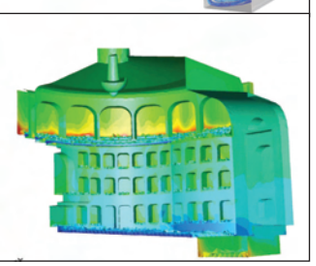
In the *Intelligent Environment and E-Technologies* priority research areas, our Faculty aims at applying the latest developments and tools of information technology on the area of civil engineering. The essence of these developments is that the Faculty should employ state-of-the-art tools (monitoring systems, sensory networks, modelling and simulation) in the planning and implementation of larger volume engineering projects and then in the construction and operation of the completed structures.
In the *Vehicle Technology, Transport and Logistics* priority research areas we concentrate on the transport element. Our research themes touch upon satellite technologies; the application of advanced geoinformatics databases; vehicle communication developments; the use of road network traffic models. In the interests of research and development, modern simulation software and data collection equipment will be purchased.
In the *Sustainable Energy* priority research area, a development direction in the area of renewable sources of energy aims at the optimisation of the supporting structure of new generation wind generators. In the area of nuclear energy use, we perform environment examinations of the rocks in the Bátaapáti repository which is currently under construction for the low and medium active wastes from the Paks Nuclear Power Plant. Our building energetics team deals with the energy rationalization of the existing buildings as well as the lifecycle analysis of building structures.
At the *Biotechnology, Health and Environment Protection* priority research areas, one of our main activities is the health care application of engineering methods, where we perform biomechanical researches. Regarding environment protection, one of our most important activities aims at devising cost-effective sewage water treatment technologies. In construction industry environment protection researches, we assess the competitiveness and sustainability of our objects with environmental life-cycle analysis.



Faculty of Mechanical Engineering (1871)







Gábor Stépán
Dean

The Faculty of Mechanical Engineering represents all the mechanical engineering activities of the country's economy whilst keeping an eye on world trends. Undergraduate training includes mechanical engineering, energy engineering, mechatronics, industrial product design, and design areas, upon which our six master courses are built. Surveys show that our graduate engineering professionals are the most sought after in the industry, and possess the greatest prestige if they have received their diploma at the Faculty of Mechanical Engineering of BME.

The Faculty is the principal investigator in the *Sustainable Energy* area of the university research program of BME. Its strategic research areas are related to the threefold requirements of environment and climate protection, supply security and competitiveness as follows: Energy efficiency, energy conservation, carbon neutral technologies, knowledge in support of decision making. The faculty priority of carrying out energy researches is indicated by the fact that it provides an essential research base for each department of the Faculty.

In the *Vehicle Technology, Transport and Logistics* project, the analysis of fluid mechanical equipment, fuel supply systems and other engineering subsystems are in the forefront of our research.
In the *Biotechnology, Health and Environmental Protection* project, our primary task includes the modelling of living organisms in relation to the engineering methods of medicine.
In the *Intelligent Environment and E-Technologies* project the research objective of our Faculty is to seek solutions that are capable of providing real-time management of complex engineering and economic systems in changing and uncertain environments with need to balance optimization, autonomy and cooperation.
The direction of Faculty researches in the *Nanophysics, Nanotechnology and Materials Science* project is the analysis of the characteristics improving the effects of nanoadditives, and the elaboration of hybridization procedures. The surface modification procedures are based on electrochemical, fast heating and micro-cutting procedures.

The Faculty infrastructure comprises the equipment at the laboratory and workshop premises. With the support of the industry, the development of these is a number one priority of the Faculty in order to keep up with modern technologies.

Faculty of Architecture (1873)

Gábor Becker
Dean

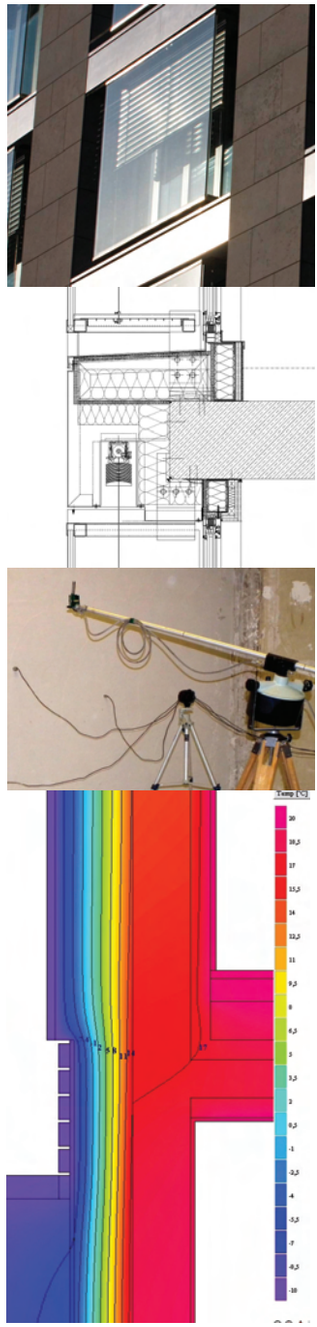
Architecture is creative work straddling the border between both the artistic and the engineering activities. The strength of traditional architect education lies in defining the balance between the two sides. This duality distinguishes the University architect diploma from other forms of diplomas and makes it unique in the academic world. The EU was the first to acknowledge and recognize the BME architectural engineering diploma without imposing any additional restrictions.

The works of the architects lecturing at our Faculty are of significant importance in contemporary Hungarian architecture. Among our professors there are four Kossuth prize holders, three members of the Hungarian Academy of Sciences and a number of Ybl prize holders. Our engineering lecturers have also contributed to numerous technological developments and scientific achievements, e.g. the inventors of 'Gömböc - Fatty Brawn' are professors at our Faculty.

An unrivalled feature of the Faculty is that its education and research activities cover the full spectrum of building activity from regional planning, settlement planning, real estate development to the planning of buildings (including the development and measurement of building structures), the organization and management of construction and the protection and restoration of historic buildings. Our research and development activities are well supported by our infrastructure, building acoustics and thermal physics laboratories.

On the basis of its traditions and intellectual potential, the Faculty maintains good professional relationships with similar domestic and foreign institutions. It frequently takes part in international programs and calls for proposals, and constantly strives to create closer connections with other relevant professional organizations.

In the coming years, the university research program will be the centerpiece of scientific research and creative activity. In the areas of sustainability, environmentally-conscious approach and the design of low energy consumption buildings, all departments of the Faculty are committed to continuous and joint research work. Within the BME university research program, the Faculty is undertaking direct research tasks in the *Sustainable Energy* and *Intelligent Environment and E-Technologies* projects. The improvement of our laboratories is also included within the frame of the program. We cover all the activities involved in construction, from settlement planning to the placement of the last nail!



Faculty of Chemical Technology and Biotechnology (1873)

György Pokol
Dean

The mission of the Faculty of Chemical Technology and Biotechnology is to educate engineers according the highest standards in the fields of chemistry, chemical engineering, bioengineering and environmental engineering, and to this end internationally competitive research is of basic importance.

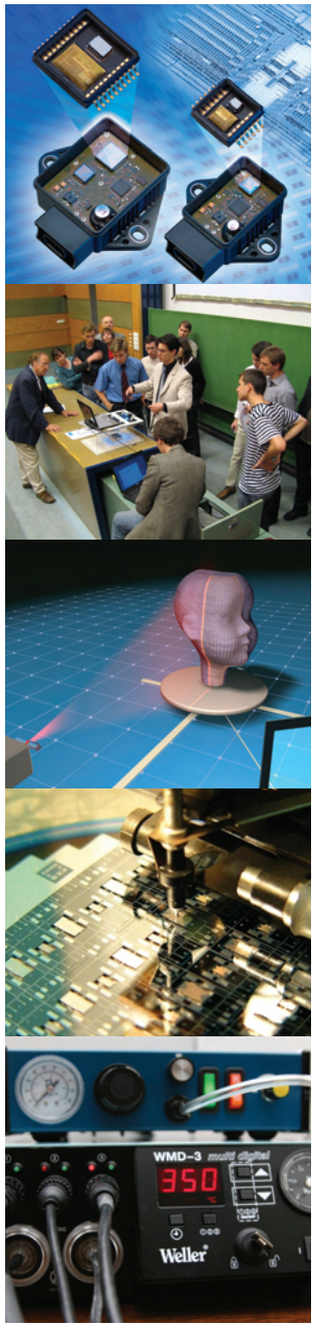
The strategic research areas were selected on the long standing research traditions of the Faculty fitting nicely to the University research program. In this research strategy the synergism of basic research and applied research and development is a central issue, resulting in the use of the most up to date ideas in the applied research, and also stimulating directly people working in the basic research. Accordingly, the key areas in the basic research are at the fields of bioinformatics and related research areas using intelligent e-technologies, in the development of biocatalytical processes and bioanalytical methods. In the latter area nanotechnological approach is often used, pinpointing the importance of this research direction. The results from these research areas can directly be used in different biotechnologies and processes in the agriculture, food industry and pharmaceutical industry, and can result in environmentally conscious "green" methods. Contribution to the sustainable energy consumption is conceivable and the use of the results in the reduction of the effects of occasional environmental damages is also a possibility.

The research in these areas can only be realized together with our traditionally cooperating industrial partners such as pharmaceutical firms, giving the direct possibility for the utilization of our results.

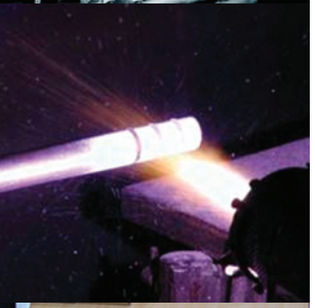
Faculty of Electrical Engineering and Informatics (1949)

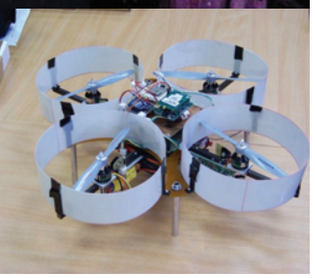
László Vajta
Dean

The mission of the Faculty of Electrical Engineering and Informatics is to become an internationally renowned educational and research centre in Hungary in the areas of electrical engineering and applied informatics. By continually developing our syllabi, our intensive research activity and the modernisation of our infrastructure, the Faculty intends to ensure that the diplomas and doctoral degrees awarded should be acknowledged as being highly prestigious qualifications both at home and abroad.
The Faculty also intends to achieve a double purpose from the implementation of the university research programme: (1) to enhance research effectiveness by focusing its existing capabilities in strategic areas by harmonizing them with the activities of other faculties. (2) to boost the development of those areas that are expected to play increasing roles in the future.
The means by which we can achieve these aims include the deliberate development of human resources; giving priority support to the development of talent; the improvement of research cooperation with students; the acceleration of infrastructural development; the monitoring of research-development project efficiency whilst supporting and accelerating transfer processes.
The strategy of the Faculty focuses on intelligent environment and e-technologies, in both basic and applied research and in redefining the man-machine relationship. The development of network applications, data transmission technologies, the research of virtual worlds, intelligent systems and many other areas all serve this purpose. These researches naturally play a significant role in other priority research areas of BME, namely transport, vehicle technology and logistics systems, environmentally conscious energetics, the development of health technologies and material technologies.
The Faculty strives to assist the activity and development in all strategic educational and research areas by its own achievements. It supports primarily those projects in the university research programme that will assist the research of fellow faculties. We attach key importance to the e-technology issues of energetics, transport and health areas, and provide significant support to the accelerated development of the nanotechnology domain. The implementation of BME's full university research programme is coordinated by the Federated Innovation and Knowledge Center of the Faculty.
The development of network cooperation with our academic partners (Semmelweis University, Óbuda University, ELTE, Corvinus, Pannon University, University of Szeged, research institute SZTAKI, etc.) and our industrial partners (Microsoft, Ericsson, Nokia, Samsung, E-ON, ELMÜ, MAVIR, etc.) is an organic element of the VIK strategy. We seek to make comprehensive agreements and to agree on the harmonization of our activities. We wish to avoid duplication and 'ivory tower' researches. Professional and representative organisations are important partners of the Faculty (MVSZ, IVSZ, I2F, etc.) as are technology platforms (Artemis, Nessi, etc.) and cluster organizations.



Faculty of Transportation Engineering (1951)





Béla Kulcsár
Dean

The mission of the Faculty of Transportation Engineering is to be the scientific workshop for all the technical, logistical, organizational and economic areas related to the transport process and vehicles which are integral parts of the system. All these areas are the bases for research activity based engineering training and education at undergraduate and doctoral level. Within this framework, the Faculty can ensure the renewal and versatility, the development and practical utilization, of the knowledge necessary for the development of society.

It is a cornerstone of the Faculty's mission that it undertakes a level of scientific activity which is recognized both at home and internationally. Alongside this activity, the Faculty also undertakes research and development, offering expertise and consultation to transport and vehicle industry companies, the logistics services sector and to industrial policy makers. The Faculty is also open for multilateral domestic and international scientific and professional co-operations. To achieve these, the Faculty maintains active relationships with key European tertiary education institutions in similar areas of training, and encourages the versatile mobility of lecturers, researchers and students, and the establishment and development of their personal/professional relationships. The Faculty regards the provision for doctoral training in its area of expertise as one of its missions.

The Faculty implements research and development programmes, by which it can provide new knowledge and development results which can be directly utilized by transport and vehicle industry companies, and the logistics services sector.

Medium term cooperation with companies directly interested in research, development and innovation is equally important. The involvement of these companies in longer term research projects, the joint planning of appropriate research directions and communicating the latest international scientific knowledge and technological developments to the industry are also essential.

As the national knowledge centre of transportation engineering, vehicle engineering and logistics engineering, it is the mission of the Faculty to be continuously at the disposal of industry with its professional expertise and knowledge, and to bring about fast and efficient solutions to industrial problems requiring a deeper professional expertise than the average norm.

Faculty of Natural Sciences (1998)

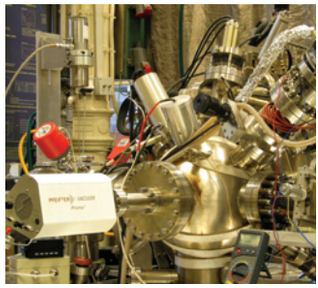
Péter Moson
Dean

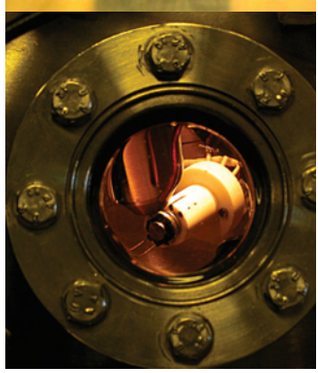
The Faculty of Natural Sciences trains and undertakes internationally distinguished research in the areas of Physics (Institute of Physics), Mathematics (Institute of Mathematics), Nuclear Techniques (Institute of Nuclear Techniques) and Cognitive Sciences (Department of Cognitive Science).

Our primary task is the teaching of Mathematics and Physics - continuously modernising the syllabi (e.g. by using digital learning materials), aligning them to the requirements (e.g. catch-up courses, talent care) - of the technical and economic courses of BME.
The bachelor training (Mathematics, Physics), master courses (Physics, Mathematics, Applied Mathematics, Cognitive Studies), and doctorate schools (Physics, Mathematics and Computer Science, Psychology-Cognitive Science) of the Faculty are evaluated as nationally outstanding.

The themes of the *Nanophysics, Nanotechnology and Materials Science* projects, originated by the Faculty in the BME university research programme, will be the main priority areas of faculty researches in the upcoming period. We are endeavouring to create a similar priority theme in the stochastics and its applications field. Both these and other themes provide the opportunity to bring our faculty researchers closer to the activities of other (national and foreign) partners.
The participation of our Faculty in the *Sustainable energy, Biotechnology, Health and Environment Protection, and the Intelligent Environment and E-technologies* project implementations serves the cooperation between the BME faculties. At the Faculty of Natural Sciences a number of other areas perform internationally outstanding research (algebra, algorithm theory, nonlinear processes, financial analyses, cognitive neuroscience, nuclear energetics, nuclear techniques, applied optics, etc.), which we intend to continue to support and develop.

The training and research reactor - a nationally unique facility of the Faculty - is currently undergoing renovation and modernization. This will enable the high level implementation of researches and specialist training necessary for the extension of service life of the Paks Nuclear Power Plant.
Using the opportunities offered by calls for applications, we intend to develop significant research opportunities for post-doctorates, and to constantly strive to attract the very best people to undertake this work.
We consider it an equally important task to develop and to maintain good relationships with our industrial partners.





Faculty of Economic and Social Sciences (1998)

János Kövesi
Dean

The Faculty of Economic and Social Sciences was established during the organisational restructuring of the University in 1998. By taking this step, BME returned to its historical traditions since its predecessor the Palatine Joseph University of Technology and Economics assumed the fundamental task of high level training of economists.

Among its past Rectors we find Farkas Heller, the internationally renowned professor of economics. The establishment of the Faculty created the conditions for satisfying the needs and expectations of the labour market aligned to the changing requirements of modern economy that equally expects the technical, economic, managerial, communication and social science knowledge. The key task of the Faculty it is to teach economics, management and business economics and business law as obligatory subjects. Whilst social science courses are elective there is a need to ensure foreign language training for University students as well as physical education to preserve and improve their health.

The Faculty provides 6 bachelor, 13 master and several specialised postgraduate training courses in the areas of economic science and social science. In Autumn 2010, 1,420 new students commenced their studies at the Faculty which has a total of approximately 6400 students. In the two Doctorate Schools managed by the Faculty, 63 persons are studying for doctorates. The scholarly students' circle activity is also outstanding.

Our quality system is operated on the basis of the total quality management (TQM) philosophy. We regularly analyse the needs and satisfaction of our 'customers' (secondary schools, our students, employers). We attribute decisive role to the Student Evaluation of Education. In our view, tertiary education is interpreted as a service offered on domestic and international knowledge markets, therefore only continuous development supported by a TQM management climate can establish the conditions for the successful operation of the Faculty.

Based on the attitude of researchers at the University of BME, our Faculty intends to become an esteemed partner to both industry and to other important institutions in the future. We also wish to preserve our excellent position in the professional ranking of domestic economic science education. The continuously internationally recognized research achievements of our colleagues ensures that this growth will continue. The list of researches carried out during the period 2008-2010 demonstrating the intellectual knowledge asset portfolio of the Faculty can be viewed on our website.

Contacts

Project Presidency

László Vajta
Dean

Gábor Péceli
Rector

Gábor Stépán
Dean

Project management

Kálmán Kovács Director, Project Manager
Federated Innovation and Knowledge Centre
H-1111 Budapest, Egry József utca 18. V1 526.
Telefon: +36-1-463 1669
E-mail: kovacsk@mail.bme.hu

Sándor Tömösközi Associate Professor,
Technical Expert
BME Department of Applied Biotechnology
and Food Science
Telefon: +36-1-463 1419
E-mail: tomoskozi@mail.bme.hu

Leaders of priority research areas

Sustainable energy
Gyula Gróf
Associate Professor, Head of Department, SE Subproject Leader
BME Department of Energy Engineering,
H-1111 Budapest, Bertalan Lajos utca 4-6. D épület 2. emelet 208.
Telefon: +36-1-463-2613, +36-1-463-2564
E-mail: grof@energia.bme.hu

Vehicle technology, transport and logistics
István Varga
Associate Professor, VTL Subproject Leader
BME Department of Control and Transport Automation,
H-1111 Budapest, Bertalan Lajos u. 2. Z épület 5. emelet 514.
Telefon: +36-1-463-2255, +36-1-279-6227
E-mail: ivarga@mail.bme.hu

Biotechnology, health and environment protection
András Szarka
Associate Professor, BHE Subproject Leader
BME Department of Applied Biotechnology and Food Science,
H-1111 Budapest, Szent Gellért tér 4., Ch. III.
Telefon: +36-1-463-3858
E-mail: szarka@mail.bme.hu

Nanophysics, nanotechnology and materials science
György Mihály
Professor, Head of Department, NNM Subproject Leader
BME Department of Physics,
H-1111 Budapest, Budafoki út 6-8., F épület I. lépcsőház, 1. em. 12.
Telefon: +36-1-463-2313
E-mail: mihaly@phy.bme.hu

Intelligent environment and e-technologies
Hassan Charaf
Associate Professor, IET Subproject Leader
BME Department of Automation and Applied Informatics
H-1117 Budapest, Magyar tudósok krt. 2. Q épület QB204
Telefon: +36-1-463-3969
E-mail: hassan@aut.bme.hu

Faculties

Civil Engineering
Address: H-1111 Budapest,
Műegyetem rkp. 3. K I. 16.
Telefon: 463-3531
E-mail: alovas@mail.bme.hu
www.epito.bme.hu

Mechanical Engineering
Address: H-1111 Budapest,
Műegyetem rkp. 3. K I. 14.
Telefon: 463-3541
E-mail: stepan@mm.bme.hu
www.gpk.bme.hu

Architecture
Address: H-1111 Budapest,
Műegyetem rkp. 3. K I. 10.
Telefon: 463-3521
E-mail: gbecker@epsz.bme.hu
www.epitesz.bme.hu

Chemical Technology and Biotechnology
Address: H-1111 Budapest,
Műegyetem rkp. 3. K I. 9.
Telefon: 463-3571
E-mail: pokol@mail.bme.hu
www.ch.bme.hu

Electrical Engineering and Informatics
Address: H-1117 Budapest,
Magyar tudósok krt. 2. Q. B. mfsz.8.
Telefon: 463-3581
E-mail: vajta@iit.bme.hu
www.vik.bme.hu

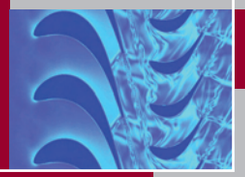
Transportation Engineering
Address: H-1111 Budapest,
Műegyetem rkp. 3. K I. 15.
Telefon: 463-3551
E-mail: kulcsar-bela@eagt.bme.hu
www.kozlek.bme.hu

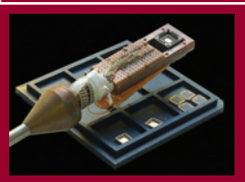
Natural Sciences
Address: H-1111 Budapest,
Műegyetem rkp. 3. K I. 7.
Telefon: 463-3561
E-mail: moson@bme-tk.bme.hu
www.ttk.bme.hu

Economics and Social Sciences
Address: H-1117 Budapest,
Magyar tudósok krt. 2. Q. A. mfsz. 8.
Telefon: 463-3591
E-mail: kovesi@mvt.bme.hu
www.gtk.bme.hu

Further information:
www.bme.hu, www.kutatas.bme.hu

Content





MŰEGYETEM 1782

Nemzeti Fejlesztési Ügynökség
www.ujszechenyiterv.gov.hu
06 40 638 638

MAGYARORSZÁG MEGÚJUL

A projekt az Európai Unió támogatásával, az Európai Regionális Fejlesztési Alap társfinanszírozásával valósul meg.

Development of quality-oriented and harmonized R+D+I strategy and functional model at BME
TÁMOP-4.2.1/B-09/1/KMR-2010-0002
Budapest Univerity of Technology and Economics
www.bme.hu
www.kutatas.bme.hu

University Strategy at BME