FACULTY OF INFORMATION TECHNOLOGY

BRNO UNIVERSITY OF TECHNOLOGY

ANNUAL REPORT 2005
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FACULTY OF INFORMATION TECHNOLOGY
BRNO UNIVERSITY OF TECHNOLOGY

I. INTRODUCTION

Brno University of Technology (BUT) is the second largest and the second oldest technical university in the Czech Republic. It was founded in 1849 for technical, agricultural and commercial specialization. The languages of instruction were Czech and German. As a consequence of political and national disputes, Czech ceased to be used as language of tuition and in 1899 the Czech High Technical School was founded in Brno. After World War I and the foundation of Czechoslovakia, the school merged with the German Technical High School (originally bilingual) to form the High Technical School in Brno, which later carried the name of Dr. Edvard Beneš, the second president of Czechoslovakia. In the period between World War I and World War II this school was among the best technical universities in Europe.

During World War II the school was, as all other high schools were, closed and the premises were used by German military institutions, and most equipment was destroyed. Immediately after the end of World War II the activities of the school were resumed. In 1951, the Technical High School was closed and the departments became parts of the newly established Military Technical Academy. Tuition for civilians continued at the former faculty of civil engineering only. However, it soon became evident that the technical university should be re-established. Since 1956 the school gradually started its activities in various fields.

The Faculty of Information Technology (FIT) at Brno University of Technology was established on 1st January 2002 from the former Department of Computer Science and Engineering, Faculty of Electrical Engineering and Computer Science, Brno University of Technology. The Department of Computer Science and Engineering (DCSE) was established in 1964. Further development of the Department was related to the dynamic development in the area of computer science and its applications, called informatics. The ever-increasing demands on specialists in this area determined the extent and orientation of the teaching, research tasks and joint projects and they also influenced the increase in number of students and staff of the Department. The increasing importance of teaching informatics at the faculty brought a transformation to the Faculty of Electrical Engineering and Computer Science (FEECS) in 1993 and separation of the computer science study plans from the rest not later than after the 1st semester of the common study programme.

At the end of the millenium the importance of the DCSE and the ratio of informatics in teaching exceeded the organizational, technical and financial limits so that the transformation of the DCSE into a new faculty could be launched.

A number of historical decisions were taken at the FEECS in 2001 in connection with the planned foundation of a new Faculty of Information Technology (FIT) and
transformation of the **Faculty of Electrical Engineering and Computer Science (FEECS)** into the **Faculty of Electrical Engineering and Communication (FEEC)**. The Academic Senate of BUT approved the establishment of the faculty to 1st January 2002. The uneasy task of working out new study programmes for both faculties for accreditation was crowned by an approval of new study programmes for both faculties by the Accreditation Board of the Ministry of Education of the Czech Republic and its consent with the foundation of the new faculty. In case of the FIT it was a three-year Bachelor’s study programme, and a follow-up two-year Master’s study programme.

In the third year of the second three-year office, BUT was directed by **prof. Ing. RNDr. Jan Vrbka, DrSc., Dr.h.c. Doc. Ing. František Zbořil, CSc.**, a member of the Department of Intelligent Systems, was another significant leading personality of BUT coming from our faculty – he was the Chairman of the Academic Senate of Brno University of Technology (AS BUT), **doc. Dr.Ing. Petr Hanáček**, Head of the Department of Intelligent Systems, worked as a member of the Economic Committee of the AS BUT and since 25th October 2005 as the Chairman of the Chamber of Academic Staff and Vice-Chairman of the AS BUT. **Ing. Jaroslav Švec**, a student of postgraduate doctoral study at the FIT, worked as a Vice-Chairman and the Chairman of the Students’ Chamber of the Academic Senate of BUT up to 25th October 2005.

In 2005, **prof. Ing. Tomáš Hruška, CSc.**, the Dean, directed the FIT together with five Vice-Deans. The Vice-Deans are in charge of research and creative activities, international and external relations and campus development in co-operation with the relevant Dean’s Office Departments. The Scientific Board, the Pedagogical Council and the Disciplinary Board are the Dean’s advisory bodies. The Faculty Secretary is responsible for faculty organization, development and economic issues, which are carried out by the relevant Dean’s Office Departments. In 2005, there was a teaching staff of 48 members and 1916 students in all state-supported study programmes.

The faculty management in 2005:

- **prof. Ing. Tomáš Hruška, CSc.** – Dean
- **prof. RNDr. Milan Češka, CSc.** – Vice-Dean, Science and Research
- **prof. Ing. Jan M. Honzík, CSc.** – Vice-Dean, Public Relations
- **Acting Dean**
- **doc. Ing. Vladimir Drábek, CSc.** – Vice-Dean, Education
- **Ing. Miloš Eysselt, CSc.** – Vice-Dean, Students Affairs
- **Ing. Zdeněk Bouša** – Vice-Dean, Campus Development

**Ing. Zdeněk Bouša** worked as the Faculty Secretary. **Doc. Ing. Jaroslav Zendulka, CSc.**, Head of the Department of Information Systems, was the Chairman of the Academic Senate of the FIT. **Ing. Petr Lampá**, Head of the Computer Centre FIT BUT, was the first Vice-Chairman of the Academic Senate of the FIT BUT.

**Zdeněk Letko**, a student, worked in the position of the second Vice-Chairman of the Academic Senate of the FIT, and, at the same time, in the position of the President of the Student Union FIT BUT. **Doc. Ing. Josef Schwarz, CSc.**, represented the Trade Union in the faculty management.
In its fourth year, the faculty consisted of four departments and the Computer Centre:

- Department of Information Systems
- Department of Intelligent Systems
- Department of Computer Graphics and Multimedia
- Department of Computer Systems
- Computer Centre

In 2005, the FIT continued tuition in the below-mentioned Bachelor's and Master's study programmes **Electrical Engineering and Computer Science (EI)**, registered in 1999 according to University Education Act. These running out study programmes are likely to continue until the end of the academic year 2006/2007. In 2005, the FIT also provided tuition in the **Ph.D. study programme Information Technology (DIT)**. 2005 was the fourth year of the existence of the three-year **Bachelor's study programme Information Technology**, which was introduced to the faculty in 2002/2003. In 2005/2006, a two-year follow-up **Master's study programme Information Technology (MIT)** was launched with 206 students. These new study programmes correspond to the Bologna Declaration on the Development of Higher Education in Europe and their structure of studies is fully compatible within Europe.

**Study programmes taught at the FIT in 2005:**

**Bachelor's study programme Electrical Engineering and Computer Science**, nominal length of study: 3.5 years, line of study:
- Computer Science and Engineering

**Follow-up Master’s study programme Electrical Engineering and Computer Science**, nominal length of study: 3 years, line of study:
- Computer Science and Engineering

**Master’s study programme Electrical Engineering and Computer Science**, nominal length of study: 5 years, line of study:
- Computer Science and Engineering

**Bachelor’s study programme Information Technology**, nominal length of study: 3 years, line of study:
- Information Technology (BIT)

**A new follow-up Master’s study programme Information Technology launched at the FIT in the academic year 2005/2006 with the following lines of study:**
- Information Systems (MIS)
- Computer Graphics and Multimedia (MGM)
- Intelligent Systems (MIN)
- Computer Systems and Networks (MPS)

**A Doctoral study programme - nominal length of study: 3 years (internal form) or 7 years (combined form), line of study:**
- Information Technology (DIT)
In 2005, 187 Bachelors, and 92 students of the five-year Master’s study programme graduated at the FIT and 14 students completed the Ph.D. study programme. 601 new students entered the first year of the regular Bachelor’s study programme, 206 students entered the follow-up Master’s study programme, and 26 students entered the postgraduate doctoral study, 24 of them in the internal form, and 2 of them in the combined form of study.

Four foreign students were provided tuition in English.

In 2005, four habilitation proceedings for the title of “Docent” (Associate Professor) were initiated. prof.RNDr. Alexandr Meduna successfully completed the professorship procedure and doc.Dr.Ing.Dušan Kolář the habilitation proceedings for the title of “Docent” (Associate Professor).

The most significant events and activities that influenced the life at the faculty in 2005 were the following:

- Open Day at the FIT BUT, on 14th January, 2005,
- The traditional FIT/FEEC ball, a high-level and well-organized event which took place in Voroněž Hotel, on 28th January 2005,
- Work on the innovation of the “Long-Term Plan of Development of BUT”,
- Open Day for those interested in the Doctoral study programme at the FIT BUT, on 27th April, 2005,
- The beginning of construction work related to the project of “Reconstruction and building of Božetěchova 1 and Božetěchova 2 campuses”,
- Activities of the pedagogical staff of the FIT related to the new study programmes,
- 6 new GACR (Grant Agency of the Czech Republic) projects were accepted in 2005, the total number of GACR projects at the faculty being 14 (8 standard, 1 doctoral and 5 postdoctoral projects),
- 10 new FRVS (University Development Fund) projects were accepted,
- 5 MSMT (Ministry of Education) projects were worked on,
- Three EU projects were worked on - the first one – Augmented Multiparty Interaction (AMI) Project, (with prof.Ing. Hynek Heřmanský, doc. Dr. Ing. Jan Černocký, and doc. Dr. Ing. Pavel Zeměčík as fellow-researchers and heads of the FIT teams), the second one – IST Multi Modal Meeting Manager, and the third one – Design and implementation of embedded formal verification assistants in the NET framework (Microsoft Grant, GB),
- Two CESNET projects were worked on,
- Engineering products: Ing. Ondřej Ryšavý, Ph.D.: Vutbrmsr.NET class library. This software project implements the elements of open-ended infrastructure for the development and implementation of verification algorithms and data structures in Rotor/.NET Microsoft environment, the method of generic programming has been used to achieve algorithm efficiency and maximum re-usability.
- Participation of the Speech@FIT group (Ing. Pavel Matějka, Ing. Lukáš Burget, Ph.D., and Ing. Petr Schwarz) in NIST – evaluation of systems for automated language identification: won the first place in two categories, and one second place in another category, all in a strong competition of 13 academic and industrial laboratories from the whole world,
• Experts from the FIT participated in the evaluation of exhibits for the “Cristal Disc” award at INVEX trade fair,
• Co-organization of the NETSS 2005 international conference, Přerov, 22nd-23rd February 2005,
• Co-organization of the MOSIS 05’ conference (Modelling and Simulation of Systems), Brno, 19th to 21th April 2005,
• Organization of the ISIM’05 conference (Information Systems Implementation and Modelling), Hradec nad Moravici, 19th to 21th April 2005,
• Co-organization of the EMI, international students’competition supported by Honeywell,
• Activities of doc. Ing. Vladimír Drábek, CSc., Vice-Dean, and his colleagues resulting in automated assessment of written entrance examinations,
• Activities of pedagogical staff connected with information sessions at different types of secondary schools,
• Co-organization of STUDENT EEICT 2005 conference, the main organizer being the Faculty of Electrical Engineering and Communications, Brno University of Technology,
• Participation in the GAUDEAMUS 2005 trade fair and presentation of the FIT and its study programmes,
• Elections to the Academic Senate of BUT, on 11th October 2005,
• Computer Science Education Workshop (CSEW) of Czech and Slovak depatments and faculties concerned with computer science, Býkov Hotel, Plzeň, 20th to 21st October 2005,
• Activities of the AS FIT BUT members, namely doc. Ing. Jaroslav Zendulka, CSc., Ing. Petr Lampa, Ing. Bohuslav Křena, Ph.D., and Zdeněk Letko, focused on faculty interests in the areas of organization, development and economy,
• Opening ceremony of the Cisco Academy at the FIT, on 11th November 2005,
• Lectures and discussions with IBM researchers, organized by the FIT BUT within the IBM Innovator’s Tour, on 1st December 2005,
• Activities of prof.Ing. Jan M. Honzík, CSc., Vice-Dean for Public Relations, in Socrates/Erasmus, and other European programmes,
• Activities of prof. Ing. Jan M. Honzík, CSc., concerned with preparing the Bachelor’s “Information Technology“ programme and its distance form for accreditation, with relation to the development programmes of the Ministry of Education,
• Improvements in the student section of the FIT information system.

**Significant Awards in 2005**

The [**Rector's Award**](#) was conferred to [**Ing. Lukáš Sekanina, Ph.D.**](#) for his outstanding results in teaching and science.

[**Ing. Lukáš Sekanina, Ph.D.**](#) and [**Ing. Michal Bidlo**](#) were awarded the [**Certificate of Merit**](#) for their evolutionary design of arbitrarily large sorting networks in the Human-Competitive Awards in Genetic and Evolutionary Computation held within the framework of 2005 Genetic and Evolutionary Computation Conference (GECCO-2005) in Washington DC,USA.

[**Ing. Lukáš Sekanina, Ph.D.**](#) was awarded [**EvoHOT – Prize for the best article**](#) - for the research results published in his article called Evolutionary Design of Gate-Level
Polymorphic Digital Circuits and presented at the 2nd European Workshop on Evolutionary Computation in Hardware Optimisation, Lausanne, Switzerland 2005.

**Ing. Lukáš Sekanina, Ph.D.** received the **Siemens Award** for his prestige scientific publication.

**Ing. Martin Drahanský** received the **Siemens Award** for Ph.D. students for his excellent doctoral dissertation awarded by the Industry and Higher Education Forum.

**Ing. Martin Švec** was awarded **Josef Hlávka Prize** for his excellent dissertation called Grammars with Context Conditions and Their Applications.

Three Ph.D. students of the FIT BUT were awarded **prof. Hlávka Prize** at the Czech-Slovak seminar Computer Architecture and Diagnostics which was held on 21st – 23rd September 2005 in Sedmihorky: **Ing. Michal Bidlo** in the category of the first year, and **Ing. Jiří Jaroš** in the category of the second year. Ing. Tomáš Pečenka was placed second in the category of the 2nd year.

**Ing. Pavel Matějka** won the 2nd place in a competition for the best poster within the 6th European Masters in Language and Speech summer school, 11th-15th July 2005, Edinburgh.

Placement in the finals of **ACM Student Research Competition 2006** in the field of information and communication technologies, namely the award-winning work done by **Petr Boháček, Bc., Ivo Řezníček, Bc., and Jan Pazdera, Bc.** from the FIT BUT.

Excellent results in the 8th International Student Competition and Conference **Honeywell EMI 2005**, section of Electronic and Information Technologies:

BSc.
1st place: **Martin Žádník, Bc.**  
2nd place: **Jan Pazdera, Bc.**  
3rd place: **Petr Boháček, Bc.**  

MSc.
3rd place: **Stanislav Kontár**  

Ph.D.
1st place: **Ing. Pavel Matějka**

**General Electric Award** in the form of 15 grants was awarded at the US Embassy to Czech students, among others to the following students of the FIT: **Jiří Tobola, Bc., Marek Židek, Bc., and Ladislav Ruttkay, Bc.**

**In 2005, FIT BUT continued co-operating with the following significant partners:**
- ANF Siemens Austria
- ApS Brno
- AutoCont CZ
- CAMEA
- CESNET
2005 was the fourth year of the existence of the FIT. The main goal was the introduction of the 1st year of a completely new follow-up Master’s study programme with 206 students admitted. The completion of restructuring the management personnel at the Dean’s office and gaining and training new high-quality staff were also highly significant.

On behalf of the management of the Faculty of Information Technology BUT I wish all members of academic staff, students, and all employees of the faculty favourable working conditions, and success in their efforts for a further development and benefit of all, despite the present complicated situation due to building work and reconstruction of the faculty premises. The building activities are performed with a prospect of significant improvement of our future working conditions. At the same time, I thank all employees who contributed to the functioning of the FIT in its fourth year of existence, for the extraordinary efforts devoted to all activities related with the foundation of the FIT, and for mutual understanding, solidarity, and wisdom they showed when seeking solutions to difficult problems.

prof. Ing. Tomáš Hruška, CSc.
Dean of the FIT BUT
II. AREAS OF ACTIVITIES AT THE FIT

II.1 Study Programmes

The rising number of applicants for the study programme „Information Technology“ can be seen in the last four lines of the following table in connection with the numbers of applicants for CSE – Computer Science and Engineering in the previous years. As the new Bachelor’s study programme (Information Technology) is linking up well to the tradition of the running out study programme Electrical Engineering and Computer Science with the specialization Computer Science and Engineering (CSE), we can compare the numbers of students interested in the specialization in the following table:

<table>
<thead>
<tr>
<th>Academic year</th>
<th>Applicants</th>
<th>Admitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996/97</td>
<td>229</td>
<td>120</td>
</tr>
<tr>
<td>1997/98</td>
<td>251</td>
<td>130</td>
</tr>
<tr>
<td>1998/99</td>
<td>245</td>
<td>140</td>
</tr>
<tr>
<td>1999/00</td>
<td>212</td>
<td>120</td>
</tr>
<tr>
<td>2000/01</td>
<td>200</td>
<td>129</td>
</tr>
<tr>
<td>2001/02</td>
<td>468</td>
<td>280</td>
</tr>
<tr>
<td>2002/03</td>
<td>2145 *)</td>
<td>340</td>
</tr>
<tr>
<td>2003/04</td>
<td>1718 *)</td>
<td>463</td>
</tr>
<tr>
<td>2004/05</td>
<td>1870 *)</td>
<td>651</td>
</tr>
<tr>
<td>2005/06</td>
<td>2135 *)</td>
<td>835</td>
</tr>
</tbody>
</table>

Numbers with *) show the number of applications. Until the academic year 2001/2002 the students had not been specialized before the end of the first semester, in fact, only students who had already been admitted to the faculty were specialized.

2135 applications for admission to the Information Technology study programme for Bachelors were sent to the FIT BUT by the 31st March 2005. The entrance examinations took place on 9th and 10th June 2005 (with a back-up term on 4th July 2005). 1518 applicants turned up to sit for the entrance examinations, which makes 71.1% of the total number. 95 applicants were exempted from the examination (i.e. admitted without the entrance examination). There was a total of 835 positive acceptance decisions in the Bachelor’s study programme, and 600 students commenced the study. There are 200 students in the follow-up Master’s study programme.

The main written exam took place in 7 turns, each of them consisted of 9 groups with the same set of tasks, and there was only one group on the back-up date.

There was only one written examination in mathematics (60 minutes, 20 tasks, 1000 points max.). The number of points necessary for admission was 508 out of 1000. The limit for “pass“ was the total of 250 points minimum.
The Answer Sheets were scanned and processed by computer to avoid errors in point counting. The scanning of one turn took 30 to 40 minutes and the results of the entrance examination were published on the official notice board and on the FIT BUT Web page about one hour later. The applicants received a notice about whether they had been admitted or not by a post-office special delivery.

Admitted: 835  
Refused (due to lack of capacity): 548  
Admission conditions satisfied by: 1278  
Failed: 240  
Absent: 523  
Admitted without the entrance examination: 95  
Matriculation: 23rd and 24th June, 2005  
601 students enrolled in the 1st year of Bachelors’ study programme IT by 31st October 2005.

Applicants for admission to the FIT were successful by 39.1 % (34.2%, 37.3%, and 21% in the previous years).

**Graduates**

The structure of the oral part of the Masters’ **Final State Examination** was based on the relevant obligatory study subjects. Besides the defence of the thesis each student had to answer two questions from selected topics.

First students of the three-year Bachelor’s study programme graduated in 2005. The topics for the Bachelor’s Final State Examination were created on basis of all obligatory subjects of the Bachelor’s study programme.

**Number of Graduates in Computer Science and Engineering (CSE) and Information Technology (IT)**

<table>
<thead>
<tr>
<th>Specialization</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE</td>
<td>77</td>
<td>96</td>
<td>107</td>
<td>99</td>
<td>87</td>
<td>91</td>
<td>90</td>
</tr>
<tr>
<td>CSEB</td>
<td></td>
<td></td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>IT-BC-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>164</td>
</tr>
</tbody>
</table>

doc. Ing. Vladimír Drábek, CSc.  
Vice-Dean, Education
II.2 Creative Activities, Science, Research and Doctoral Study

II.2.1 Science and Research

The new faculty continued in the tradition of basic and applied research in the area of computer hardware, software, prototypes of computer systems, and application of information technology in practical life. The main research areas at the FIT BUT in 2005 were the following:

- Information and Database Systems
- Computer Graphics and Multimedia
- Speech Processing
- Computer Architecture
- Intelligent Systems and Robotics
- System Modelling, Simulation and Formal Verification
- IS Security and Cryptography

In addition to the events mentioned in the introduction, let us mention some important events here which could give evidence of the faculty activities and which are likely to influence its development in the years to come:

- Activities of the co-ordination group that helps to increase the number of grants and projects the faculty will be involved in, including the EU ones.
- Acquisition of MSMT Fund resources for young researchers
- Participation in two new significant research intentions at BUT (New trends in microelectronic systems and nanotechnologies MICROSYN and Environment friendly and energy controlled system of waste and biomass recycling).
- Preparation of three projects of the Centre of Basic Research (Centre of Diagnostics and Reliability, Centre of Computer Modelling and Simulations, and Centre of Computer Graphics) and one project of the Research Centre (Czech Centre for Multimodal Data Processing)
- Preparation of the design of a new research intention of the faculty
- Publication activities of the faculty (2 monographs, 26 articles in journals and 168 contributions in conference proceedings).
- Work of the faculty members in international scientific and research organizations, editing boards of journals and programme committees of conferences (see paragraphs “Membership in Organizations and Societies“ in chapters of this Annual Report which deal with the individual departments).
- Organization of regular professional seminars with the participation of all faculty departments.
- Further development and use of the faculty information system, which helps to improve the quality of research infrastructure.
## European Union Projects at the FIT in 2005

<table>
<thead>
<tr>
<th>Agency</th>
<th>Theme</th>
<th>Project Code</th>
<th>Name of the Project</th>
<th>Total in thous. CZK</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>AMI</td>
<td>506811</td>
<td>Augmented Multi-party Interaction</td>
<td>1502</td>
</tr>
<tr>
<td>EU-HLT</td>
<td>IST</td>
<td>2001-34485</td>
<td>Multi Modal Meeting Manager</td>
<td>1040</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS1412001</td>
<td>Grant Microsoft, GB-Design and implementation of embedded formal verification assistants in the NET framework</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>2660</td>
</tr>
</tbody>
</table>

## Grant Agency of Czech Republic (GACR) Projects at the FIT in 2005

<table>
<thead>
<tr>
<th>GACR</th>
<th>Name of the Project</th>
<th>Total in thous. CZK</th>
</tr>
</thead>
<tbody>
<tr>
<td>102/05/P193</td>
<td>Optimization in diagnostics of digital systems</td>
<td>138</td>
</tr>
<tr>
<td>102/05/0278</td>
<td>New trends in research and application of voice technology</td>
<td>220</td>
</tr>
<tr>
<td>102/05/HO50</td>
<td>Integrated approach to education of PhD students in the area of parallel and distributed systems</td>
<td>1084</td>
</tr>
<tr>
<td>102/05/0467</td>
<td>Architectures for embedded systems networks</td>
<td>342</td>
</tr>
<tr>
<td>102/05/0723</td>
<td>Framework for formal specifications and prototyping of network applications of information systems</td>
<td>580</td>
</tr>
<tr>
<td>102/02/D108</td>
<td>Data-driven and anthropic coding and recognition of speech</td>
<td>132</td>
</tr>
<tr>
<td>102/03/P176</td>
<td>Formal approach to planning tests of digital circuits</td>
<td>185</td>
</tr>
<tr>
<td>102/03/P004</td>
<td>Evolvable hardware based applications design methods</td>
<td>181</td>
</tr>
<tr>
<td>102/03/D211</td>
<td>Advanced methods of automatic verification of parametric and infinite-state systems</td>
<td>193</td>
</tr>
<tr>
<td>102/04/0737</td>
<td>Modern methods of digital system synthesis</td>
<td>944</td>
</tr>
<tr>
<td>102/04/0780</td>
<td>Automated methods and tools for the development of reliable parallel and distributed systems</td>
<td>707</td>
</tr>
<tr>
<td>102/04/0871</td>
<td>Information system security – research on attacks against tamper-resistant cryptographic hardware</td>
<td>828</td>
</tr>
<tr>
<td>408/04/1370</td>
<td>Research on interactive media – a project</td>
<td>27</td>
</tr>
<tr>
<td>201/04/0441</td>
<td>Optimally integrated models of modern information technologies</td>
<td>331</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5892</td>
</tr>
</tbody>
</table>
### Higher Education Development Fund (FRVS) Projects at the FIT in 2005

<table>
<thead>
<tr>
<th>FRVS MSMT</th>
<th>Theme</th>
<th>Name of the Project</th>
<th>Total Thous. CZK</th>
</tr>
</thead>
<tbody>
<tr>
<td>59 G1</td>
<td></td>
<td>Application of image segmentation technologies for reconstruction of 3D models of objects from image</td>
<td>144</td>
</tr>
<tr>
<td>200 G1</td>
<td></td>
<td>User interface of hierarchic structures</td>
<td>109</td>
</tr>
<tr>
<td>1246 F1a</td>
<td></td>
<td>Innovation of the subjects – Functional and logic programming and Postrelational databases</td>
<td>46</td>
</tr>
<tr>
<td>1567 Aa</td>
<td></td>
<td>A specialized laboratory for teaching computer networks and distributed systems</td>
<td>1112</td>
</tr>
<tr>
<td>2192 G1</td>
<td></td>
<td>Recognition and tracking of human body parts</td>
<td>90</td>
</tr>
<tr>
<td>2987 G1</td>
<td></td>
<td>Utilization of evolutionary algorithms for implementation of adaptive image filters in FPGA</td>
<td>77</td>
</tr>
<tr>
<td>3041 G1</td>
<td></td>
<td>Evolutionary design of benchmark circuits</td>
<td>83</td>
</tr>
<tr>
<td>3042 G1</td>
<td></td>
<td>Evolutionary design of sorting and median networks using FPGA</td>
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<td>3449 G1</td>
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<td>Analysis and recognition of multi-modal meeting data</td>
<td>84</td>
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<tr>
<td>3521 Ab</td>
<td></td>
<td>Laboratory for image and sound</td>
<td>1014</td>
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### Survey of Other Research Projects at the FIT in 2005

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<td>MSM 21630505Fond M</td>
<td>Modelling and optimization of application specific computer based systems</td>
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<td>MSMT</td>
<td>MSM 21630503</td>
<td>New trends in microelectronic systems and nanotechnologies (MICROSYN)</td>
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<td>MSMT 613</td>
<td>Support of new structure and modularity of study programmes at BUT</td>
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<td>MSMT</td>
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<td>Integration project of development of tuition in English, improving the language competence, including the internationalization of study programmes</td>
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<td>Integration project of development of distant and combined forms of education at Brno University of Technology</td>
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<td>MSMT 618</td>
<td>Pilot joint international education programme</td>
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<td>MSMT</td>
<td>1K04106</td>
<td>Reputation-based security in information systems</td>
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<tr>
<td>AVCR</td>
<td>IET400750408</td>
<td>Rapid prototyping tools for development of HW-accelerated embedded image- and video-processing applications</td>
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<td><strong>Total</strong></td>
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<td><strong>10432</strong></td>
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Survey of external sources in funding creative activities at the FIT in 2005

<table>
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<th>Source</th>
<th>Project</th>
<th>Number of Projects</th>
<th>Total Thous. CZK</th>
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<td>Other MSMT projects</td>
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<td>Grant agency of CR projects</td>
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<tr>
<td>AVCR</td>
<td>Academy of Science of CR project</td>
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<td>EU</td>
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<td><strong>21821</strong></td>
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</table>

Funding creative activities at the FIT BUT from external sources in 2005

- **MSMT**: 59%
- **GACR**: 27%
- **EU**: 12%
- **AVCR**: 2%
II.2.2 Doctoral Study Programme

The Information Technology doctoral study programme with one specialization of the same name was started at the same time as the FIT BUT – on 1st January 2002. The main tasks solved in this area in 2005 were the following:

- Offer of a wide choice of courses at a high professional level, a well-balanced combination of theory and applications of IT, and availability of detailed descriptions of the individual courses (in Czech and English) on the Internet for both present and future students.
- Co-operation with the Faculty of Electrical Engineering and Communications, BUT, Faculty of Business and Management, BUT, and with the Faculty of Informatics, Masaryk University in Brno as far as the offer of courses, organization of the State Doctoral Examinations, and defenses of dissertations are concerned.
- Integrated approach to education of PhD students in the area of parallel and distributed systems, a GACR doctoral grant in co-operation with the Faculty of Informatics, Masaryk University in Brno.
- 1st Doctoral Workshop on Mathematical and Engineering Methods in Computer Science – MEMICS 2005 - in co-operation with the Faculty of Informatics, Masaryk University in Brno.
- Consistent checking of the individual study plans of Ph.D. students followed by differentiated payment of extra scholarship money.
- Introduction of a system encouraging students to complete their dissertations during the 3rd and 4th years of study with the use of scholarship money “stimulus”.
- Creation of a new concept of organization and content of doctoral examinations to achieve a more efficient closing of this important phase of the doctoral study.
- Record of dissertation theses and offer of new themes through the Faculty Information System.
- Participation of Ph.D. students in regular professional seminars held at the departments and at the faculty.

### PhD. study statistics

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<th>Year</th>
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<td>7</td>
<td>combined</td>
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<tr>
<td>Total</td>
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<td>109</td>
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</table>
Ph.D. theses defended in 2005
Ph.D. student: Martin Švec
Study area: Information technology
Thesis: Grammars with Context Conditions and Their Applications
Supervisor: doc. RNDr. Alexandr Meduna, CSc.
Defended on: 25th March 2005

Ph.D. student: Martin Drahanský
Study area: Information technology
Thesis: Biometric Security Systems – Fingerprint Recognition Technology
Supervisor: doc. Ing. František Zbořil, CSc.
Defended on: 3rd June 2005

Ph.D. student: Vladimír Bartík
Study area: Information technology
Thesis: Association rule discovery in databases
Defended on: 16th June 2005

Ph.D. student: Vladimír Kutálek
Study area: Information technology
Thesis: Modelling and performance prediction of application-specific multiprocessor systems
Supervisor: prof. Ing. Václav Dvořák, DrSc.
Defended on: 13th September 2005

Ph.D. student: Daniel Mika
Study area: Information technology
Thesis: Application of formal approaches for the design of digital circuit test controller
Defended on: 20th September 2005

Ph.D. student: Martin Heckel
Study area: Information technology
Thesis: Application of knowledge discovery methods in texture analysis
Defended on: 13th October 2005

Ph.D. student: Ondřej Ryšavý
Study area: Information technology
Thesis: Specifying and reasoning in the calculus of objects
Supervisor: prof. Ing. Miroslav Švéda, CSc.
Defended on: 12th October 2005
Ph.D. student: Petr Matoušek  
Study area: Information technology  
Thesis: Symbolic data structures for parametric verification  
Supervisor: doc. Ing. František Zbořil, CSc.  
Defended on: 14th October 2005

Ph.D. student: Pavel Tišnovský  
Study area: Information technology  
Thesis: Hybrid particle systems  
Supervisor: doc. Dr. Ing. Pavel Zemčík  
Defended on: 11th November 2005

Ph.D. student: Stanislav Sumec  
Study area: Information technology  
Thesis: Automatic video editing  
Supervisor: doc. Dr. Ing. Pavel Zemčík  
Defended on: 11th November 2005

Ph.D. student: Martin Dobšík  
Study area: Information technology  
Thesis: Computer animation of soft tissues  
Supervisor: doc. Dr. Ing. Pavel Zemčík  
Defended on: 11th November 2005

Ph.D. student: Martin Fědor  
Study area: Information technology  
Thesis: Algorithms for interactive real-time character animation  
Supervisor: doc. Dr. Ing. Pavel Zemčík  
Defended on: 25th November 2005

Ph.D. student: Tomáš Ondráček  
Study area: Information technology  
Thesis: Adaptive multilayer neural networks  
Supervisor: doc. Ing. František Zbořil, CSc.  
Defended on: 16th December 2005

prof. RNDr. Milan Češka, CSc.  
Vice-Dean, Science and Research
II.2.3 Student Creative Activities

The student creative activity at the FIT was based on a long tradition and experience. Student conferences and competitions in computer science and information technology have been organized annually since 1972.

Since the FEECS split into the FIT and FEEC, STUDENT EEICT (Electrical Engineering, Information and Communication Technologies) Conference and Competition have been organized for students of both faculties.

In 2005, the student conference took place on 28\textsuperscript{nd} April at the premises of BUT Pod Palackého vrchem. After the opening ceremony, students of the FIT Master's study programme and Ph.D. students defended their work in the following specializations: Information systems, Graphics and Multimedia, Computer systems, and Intelligent systems.

The evaluation committees were formed by academics, sponsors, and representatives of the Student Union. After presentations the committees chose the best contributions and suggested the financial reward for the individual authors. Thus the academic approach, attractiveness for industry and students' viewpoint were encompassed. There were 20 competitors from the Bachelor’s study programme, 36 students of the Master’s study programme, and 31 doctoral students of the FIT present. All contributions were successfully reviewed and published in a shortened version in the Proceedings of the Conference. The electronic version of the proceedings can be found on the Internet and CDs.

After all committees had completed their work, a final ceremony took place in which all sponsoring companies were introduced. The representatives of the sponsoring companies together with the Vice-Deans for Research prof. Ing. Zbyněk Raida, CSc. and prof. RNDr. Milan Češka, CSc. awarded the prizes to the winners.

We hope that these students' competitions will continue in the future, as they bring unique motivation for students’ creativity work.

The importance of the student creativity is especially high in case of our young faculty as a considerable number of winners enter the Ph.D. study programme and several most outstanding graduates become new young members of the academic staff.

doc. Ing. Zdeňka Rábová, CSc.
II.3 International Relations

International activities at the FIT are dealt with by the following group: the Vice-Dean prof. Ing. Jan M. Honzík, CSc., Mrs. Michaela Studená, the assistant for public relations, and doc. Dr. Ing. P. Zemčík, a teacher with considerable international experience. International activities are focused on support of international mobility of both students and teachers, on organizing and offering tuition to foreign students who pay their tuition fees and on information and reference service. In 2005, there were bilateral agreements between the faculty and 25 foreign universities in the framework of SOCRATES/ERASMUS Programme and 37 students spent some time at study stays abroad.

Each student’s language competence for the particular study stay is highly emphasized and tested at a competition, in co-operation with the Department of Languages, the Faculty of Electrical Engineering and Communication, BUT (PhDr. Marcela Borecká).

The following table lists foreign partners who had active bilateral agreements with the FIT within the framework of SOCRATES/ERASMUS.

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<th>University</th>
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<td>Country</td>
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### Student mobilities at the FIT in 2005 - ERASMUS and others

**Stays abroad:**

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<thead>
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<td>Jakub Bednář.</td>
<td>09/05 – 12/05</td>
<td>Greece, Crete, TEI Heraklion</td>
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<td>Petr Blahak</td>
<td>09/05 – 12/05</td>
<td>Greece, Crete, TEI Heraklion</td>
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<td>Michal Butek</td>
<td>09/05 – 12/05</td>
<td>France, ESIEE Amiens</td>
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<td>Tomáš Cípr</td>
<td>08/05 – 12/05</td>
<td>Finland, Lappeenranta University of Technology</td>
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<tr>
<td>Adam Dostál</td>
<td>09/05 – 12/05</td>
<td>Spain, Universidad de Valladolid</td>
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<td>Pavel Gnia</td>
<td>10/05 – 12/05</td>
<td>Portugal, UTAD</td>
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<td>Radek Hlaváček</td>
<td>10/05 – 12/05</td>
<td>Germany, Universität Siegen</td>
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<tr>
<td>Adam Husář</td>
<td>09/05 – 12/05</td>
<td>France, ESIEE Amiens</td>
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<td>Matej Konečný</td>
<td>09/05 – 12/05</td>
<td>Finland, Helsinki University of Technology</td>
</tr>
<tr>
<td>Miroslav Koval</td>
<td>09/05 – 12/05</td>
<td>Austria, Graz University of Technology</td>
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<tr>
<td>Aleš Kovářík</td>
<td>09/05 – 12/05</td>
<td>Finland, Helsinki University of Technology</td>
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<td>Jan Kryštof</td>
<td>09/05 – 12/05</td>
<td>Finland, Oulu Polytechnic Institute of Technology</td>
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<td>Richard Latslav</td>
<td>09/05 – 12/05</td>
<td>Greece, Crete, TEI Heraklion</td>
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<td>Zdeněk Letko</td>
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<td>Lukáš Obrdlik</td>
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<tr>
<td>Ondřej Peterka</td>
<td>09/05 – 12/05</td>
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<td>Petr Pokorný</td>
<td>10/05 – 12/05</td>
<td>Belgium, Katholieke Hogeschool Brugge Oostende</td>
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<tr>
<td>Ladislav Ruttkay</td>
<td>10/05 – 12/05</td>
<td>UK, University of Bristol</td>
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<tr>
<td>Peter Trebula</td>
<td>08/05 – 12/05</td>
<td>Denmark, Odense University College of Engineering</td>
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<td>Michal Vrána</td>
<td>09/05 – 12/05</td>
<td>Spain, Universidad de Valladolid</td>
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<td>Marek Winkler</td>
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<td>Jan Bartušek</td>
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<td>Stanislav Holenda</td>
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<td>Jan Hrouza</td>
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<tr>
<td>Petr Hýl</td>
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<td>Janusz Jezowicz</td>
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<td>Jan Tichý</td>
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<tr>
<td>Tomáš Walek</td>
<td>01/05 – 07/05</td>
<td>Germany, Universität Siegen</td>
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<tr>
<td>Jiří Janeček</td>
<td>02/05 – 07/05</td>
<td>Germany, Fachhochschule Wiesbaden</td>
</tr>
<tr>
<td>Leoš Jiřík</td>
<td>01/05 – 04/05</td>
<td>Spain, Universidad de Valladolid</td>
</tr>
<tr>
<td>Tomáš Král</td>
<td>02/05 – 06/05</td>
<td>Finland, Helsinki University of Technology</td>
</tr>
<tr>
<td>Jozerf Mlích</td>
<td>02/05 – 07/05</td>
<td>Germany, Fachhochschule Wiesbaden</td>
</tr>
<tr>
<td>Jiří Slavík</td>
<td>02/05 – 06/05</td>
<td>Portugal, UTAD</td>
</tr>
<tr>
<td>Petr Vlach</td>
<td>02/05 – 06/05</td>
<td>The Netherlands, Utrecht University</td>
</tr>
<tr>
<td>Leoš Jiřík</td>
<td>09/05 – 12/05</td>
<td>Spain, Universidad de Valladolid (apart from ERASMUS)</td>
</tr>
<tr>
<td>Václav Šimek</td>
<td>10/05 – 12/05</td>
<td>Belgium, KHBO, Oostende (apart from ERASMUS)</td>
</tr>
<tr>
<td>Martin Vítek</td>
<td>10/05 – 12/05</td>
<td>Island, University of Island (apart from ERASMUS)</td>
</tr>
<tr>
<td>Vítězslav Beran</td>
<td>10/05 – 12/05</td>
<td>Germany, TU München</td>
</tr>
<tr>
<td>Jan Pečiva</td>
<td>05/05 – 11/05</td>
<td>The Netherlands, Univ. Twente (apart from ERASMUS)</td>
</tr>
<tr>
<td>František Grézl</td>
<td>01/05 – 08/05</td>
<td>USA, IDIAP Research Institute (apart from ERASMUS)</td>
</tr>
</tbody>
</table>

Unlabelled stays: Finance SOCRATES/ERASMUS, MSMT CR and the BUT mobility fund
### Visiting students:

<table>
<thead>
<tr>
<th>Name</th>
<th>Stay</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olga Rola Monteiro</td>
<td>01/05 – 01/05</td>
<td>Portugal, UTAD</td>
</tr>
<tr>
<td>Efrain Pardo</td>
<td>01/05 – 06/05</td>
<td>México, graduated from TEC de Monterrey (apart from ERASMUS)</td>
</tr>
<tr>
<td>Asko Alhoniemi</td>
<td>02/05 – 06/05</td>
<td>Finland, LUT Lappeenranta</td>
</tr>
<tr>
<td>Carlos Fresno</td>
<td>02/05 – 07/05</td>
<td>Spain, Universidad de Valladolid</td>
</tr>
<tr>
<td>Carlos Toquero</td>
<td>02/05 – 07/05</td>
<td>Spain, Universidad de Valladolid</td>
</tr>
<tr>
<td>George Pavlidis</td>
<td>02/05 – 07/05</td>
<td>Greece, TEI Crete</td>
</tr>
<tr>
<td>Raphaël Escure</td>
<td>05/05 – 08/05</td>
<td>France, ESIEE Paris</td>
</tr>
<tr>
<td>Benjamin Sebbah</td>
<td>05/05 – 08/05</td>
<td>France, ESIEE Paris</td>
</tr>
<tr>
<td>Nikos Kontakis</td>
<td>01/05 – 05/05</td>
<td>Greece, TEI Crete (LEONARDO)</td>
</tr>
<tr>
<td>Manos Lidakis</td>
<td>01/05 – 05/05</td>
<td>Greece, TEI Crete (LEONARDO)</td>
</tr>
<tr>
<td>Andreas Hatzisimeon</td>
<td>01/05 – 05/05</td>
<td>Greece, TEI Crete (LEONARDO)</td>
</tr>
<tr>
<td>Gaurav Pandey</td>
<td>01/05 – 06/05</td>
<td>India, Indian Institute of Technology Allahabad (INTERNSHIP)</td>
</tr>
<tr>
<td>Arghya Dhali</td>
<td>05/05– 08/05</td>
<td>India, Indian Institute of Technology New Delhi (INTERNSHIP)</td>
</tr>
<tr>
<td>Ahmet Buyuran</td>
<td>09/05– 12/05</td>
<td>Turkey, Yildiz Technical University</td>
</tr>
<tr>
<td>Alper Taha Yuce</td>
<td>09/05– 12/05</td>
<td>Turkey, Yildiz Technical University</td>
</tr>
<tr>
<td>José Lorenzo Escudero</td>
<td>10/05– 12/05</td>
<td>Spain, Universidad Politécnica de Madrid</td>
</tr>
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<td>Joao Silva</td>
<td>09/05– 12/05</td>
<td>Portugal, UTAD</td>
</tr>
<tr>
<td>Joao Tavares Silva</td>
<td>09/05– 12/05</td>
<td>Portugal, UTAD</td>
</tr>
<tr>
<td>Paulo Machado</td>
<td>09/05– 12/05</td>
<td>Portugal, UTAD</td>
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<tr>
<td>Bruno Morais</td>
<td>09/05– 12/05</td>
<td>Portugal, UTAD</td>
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<tr>
<td>Samuel Freire Alves</td>
<td>10/05– 12/05</td>
<td>Portugal, UTAD</td>
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<tr>
<td>Joana Alexandra Oliveira</td>
<td>10/05– 12/05</td>
<td>Portugal, UTAD</td>
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<tr>
<td>Amaro Antunes</td>
<td>09/05– 12/05</td>
<td>Portugal, UTAD</td>
</tr>
<tr>
<td>Rui Miguel Lamas Alferes</td>
<td>09/05– 12/05</td>
<td>Portugal, UTAD</td>
</tr>
</tbody>
</table>
II.4 Lifelong Education

Doc. Ing. Jiří Kunovský, CSc. again contributed to the programme of the Third Age University (U3V) by giving lectures on “Digital photography and computer graphics“. Based on the experience from the previous academic year and based on the large amount of senior students interested in his lectures, doc. Ing. Jiří Kunovský, CSc. offered “Digital photography and computer graphics“ in two separate lecture groups.

A follow-up stage of the MSMT integrated project “Preparation of the Distance and Combined Forms of Study at Brno University of Technology“ was worked on. Study materials created within this project are focused on e-learning and computer-aided technologies and can also be used for lifelong education in the future.

Ing. Martinek from the FIT provided all-year tuition of “Selected Parts of Informatics“ for the secondary school in Vídeňská Street, Brno. It took place in the FIT Computer Centre once a week and offered the following topics of computer science: programming and independent work on projects, especially in C language, operation systems – fundamentals of Unix/Linux systems (basics of control, script programming), and work with the Internet, (information retrieval, fundamentals of HTML, and Java).

Within the Government Policy on IT in Education, the FIT organized several training courses in close co-operation with ApS Brno s.r.o. In 2005, the content of the courses was specialized in the area of P1 modules, a continuation of basic Z and P modules. A total of 46 teachers from four primary and secondary schools were trained in them.

In the academic year 2005/06, the capacity of optional courses oriented on Microsoft technologies, which occupy a considerable part of the market in the area of server and development tools, was raised. The courses are unique in the academic sphere. Each of them prepares students for an international exam and for achieving the MCP Certificate – Microsoft Certified Professional, an internationally recognized certificate. Last year more than 30 students of the FIT received the certificate. Though the demand still surpasses the offered capacity, the number of students was raised and further increase has been planned due to incorporation of e-learning into the courses in the future.
II.5 Dislocation, Modernization, and Development in 2005

In 2005, the managements of BUT and FIT concentrated on the realization of the strategic investment intention of dislocation and stabilization of the FIT in Božetěchova 2 and Božetěchova 1 premises. A special attention was paid to the realization of the first stage of the completion of construction and re-construction of Božetěchova 1 premises so that it might be put into operation in the middle of 2006 at the latest. Two extra control days at the MSMT level took place in 2005 dealing with the lack of financial resources for the completion of the whole work in the anticipated extent.

The investment intention was amended by two other investment intentions which deal with the reconstruction of the refectory including its static security and including the supply of active elements, enlargement of the access path and the mobile interior. At present, the reconstruction of the former small castle in Božetěchova 1 premises, of the northern seclusion and of the indoor and outdoor sports fields have not been included due to lack of finance. Both premises were linked by a bridge and a bulding permit was applied for.

The operating documentation of the first stage of the construction was completed and a separate project on the mobile interior was made.

It is the Vice-Dean Ing.Zdeněk Bouša, who is in charge of the extremely important and demanding task of the faculty development and finance.

Ing. Zdeněk Bouša
Vice-Dean, Campus Development
II.6 Library at the FIT

In 2005, the library of the FIT aimed at providing high-quality library and information service and thus supporting the study and research activities at the faculty.

The acquisition activities were traditionally focused on supplementing the information documents through purchase and gifts. In 2005, 150 requirements for the purchase of professional literature or journals were met worth **1,264,213 CZK**. **1,111** new library items were processed and the library stock of the faculty was enlarged up to **8,300** library items and **55** journals.

The opening hours of the library, study room and computer study room were **43 hours a week**. **8079** items were borrowed from the FIT library and **88** items were provided to the FIT employees through inter-library lending or international loan service.

In 2005, several important events occurred. In January 2005, the library started a fully automated operation Aleph500 library system. All books were provided with bar codes. Online prolongation of borrowings was introduced for Aleph500 users. The library was equipped with Gateway EM 700 plexi - electromagnetic security system for books and all books were also provided with security labels.

The first year students attended lectures where they were informed about the basic library terminology and also introduced to the services of the FIT Library and other libraries at BUT.

In September 2005, new regulations of the FIT Library - the rules of the library and the list of prices for services - were agreed on, followed by collecting fines for late returns of books.

During the whole 2005, negotiations with architects took place concerning the reconstruction and enlargement of the library areas, which is planned for the period between June 2006 and October 2007.

### Finance for purchase of books in 2005 (in CZK)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Czech books</td>
<td>130,837</td>
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<tr>
<td>Foreign books</td>
<td>628,083</td>
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<tr>
<td>Financed from grants</td>
<td>285,614</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1,044,534</strong></td>
</tr>
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</table>

### Finance for purchase of periodicals in 2005 (in CZK)

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<tbody>
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<td>Czech periodicals</td>
<td>10,714</td>
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<tr>
<td>Foreign periodicals</td>
<td>208,962</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>219,679</strong></td>
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</tbody>
</table>

### Loans in 2005

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Number of registered loans</td>
<td>8,079</td>
</tr>
<tr>
<td>Number of inter-library and international inter-library loans</td>
<td>88</td>
</tr>
</tbody>
</table>

Mgr. Barbora Selingerová
Head of the Library
II.7 Annual Report - the Academic Senate of the FIT BUT in 2005

In 2005, the Academic Senate comprised:

- **doc. Ing. Jaroslav Zendulka, CSc.** *Chairman*
- **Ing. Petr Lampa** *Vice-Chairman and Chairman of the Chamber of the Academic Staff*
- **Zdeněk Letko** *Vice-Chairman and Chairman of the Student Chamber*

**Chamber of Academic Staff**

Dr. Ing. Otto Fučík (ÚPSY)
Ing. Radek Kočí, Ph.D. (ÚITS)
Ing. Bohuslav Křena, Ph.D. (ÚITS)
doc. Ing. Jiří Kunovský, CSc. (ÚITS)
Ing. Petr Lampa (CVT)
prof. RNDr. Alexander Meduna, CSc. (ÚIFS)
Ing. Tomáš Vojnar, Ph.D. (ÚITS)
doc. Ing. Jaroslav Zendulka (ÚIFS)

**Student Chamber**

Ing. Vítězslav Beran (Ph.D. programme IT)
Michal Hejč (Bachelor’s programme IT)
Jaroslav Kapoun (Master’s programme EI, CSE specialization)
Zdeněk Letko (Bachelor’s programme IT)
Jana Melicheríková (Master’s programme EI, CSE specialization)

**AS FIT Committees**

**Legislative Committee**

Ing. Vítězslav Beran
Michal Hejč
Ing. Bohuslav Křena, Ph.D. – *Chairman*
doc. Ing. Jiří Kunovský, CSc

**Economic Committee**

Dr. Ing. Otto Fučík
Ing. Petr Lampa – *Chairman*
Ing. Tomáš Vojnar, Ph.D.
Ing. Vítězslav Beran
Jana Melicheríková
Activities of the AS FIT

The Academic Senate gathered at one unscheduled and eight regular meetings in 2005 with an average attendance of 88%. All meetings had a quorum. The extra meeting was held to discuss and agree on some of the Dean’s suggestions after his election for another term of office.

With regard to the election of the Dean which took place in December 2004 the AS of the FIT discussed the Dean’s suggestions for nomination of Vice-Deans, Heads of Departments and CVT FIT, and agreed on the composition of the Scientific Board of the faculty.

As the accreditations of some of the study programmes ended in 2005, the Academic Senate of the FIT discussed the prolongation of their accreditations and a proposal of accreditation of a new follow-up Master’s study programme Information Technology.

As far as the internal regulations are concerned, some amendments of the Dean’s Regulations completing the Study and Examination Regulations of BUT were agreed on.

In the parts related to the Bachelor’s and Master’s study programmes some formal adjustments were made, some conditions for subject registration in the final stage of study were defined more precisely, as well as conditions for recognition of a part of the study. In the Ph.D. study programme, the Study Branch Board agreed on a shortening of compulsory teaching period by one semester for the new Ph.D. students and consequently on the number of subjects to be completed. As a result, the date of the State Ph.D. Examination was shifted by one semester. The 5-year validity limit of the State Ph.D. Examination was also cancelled.

The AS FIT also advanced a proposal to amend the Electoral Rules and Rules of Procedure of the FIT. It should enable the electronic form of elections to the AS FIT. At the end of the year, the AS FIT discussed and advanced for approval some amendments of the Scholarship Rules of BUT, especially these related to scholarships. Students should be motivated to achieve better study results by an increase of the maximum limit of scholarship and by the possibility of achieving it even in the first year of the follow-up MSc. study, or even BSc. study programme.

As for internal standards, a Dean’s regulation concerning the Instructions for counting the pedagogical load for internal needs of the FIT BUT was discussed and approved. Some minor amendments were also made in the Internal Regulations for Admission and in the requirements for admission to the Bachelor’s study programme called Information Technology at the FIT BUT.

In the economic field, the Academic Senate agreed on the annual report on financial management of the FIT in 2004 and approved the FIT budget for 2005. In its meetings in October and November, the senate discussed the drawing the funds and agreed on the division of the financial reserves.

An important event took place in 2005: the elections for the Academic Senate of BUT and a nomination of a candidate for the position of Rector. The AS FIT participated in both events according to the law and school regulations. The fact that the elections for the Academic Senate of BUT were successfully completed in the first round must be highly appreciated.

A total of 32 decisions, out of which 16 concerned internal regulations and 4 economic issues, were approved. The other decisions referred to the new faculty officers and members of the Scientific Board of the FIT after the election of the Dean, to the elections for the Academic Senate of BUT, and to the nomination of a candidate for the position of Rector.

The Legislative Committee met only once, on 31st May 2005 to discuss the changes in the Electoral Rules and Rules of Procedure of the AS FIT (the possibility of electronic elections) and the FIT Dean’s Amendments to the Study and Examination Rules of Brno University of Technology (subjects recognition). The other proposals were dealt by the Legislative Committee through correspondence. The Economic Committee of the AS FIT met twice to discuss the FIT budget for 2005 and to discuss the division of incurred financial reserves.

Doc. Ing. Zdeňka Rábová, CSc. worked as the FIT Deputy in the Czech Council of Higher Education (CHE). In 2005 she worked as the Chairperson of the Commission for Student Creativity and a member of the Commission for Information Technologies in higher education. For the new term of office, the AS FIT proposed and the AS BUT approved Ing. Bohuslav Křena, Ph.D. to be the faculty Deputy in the Czech Council of Higher Education.

More detailed information about the individual sessions of the AS FIT can be found in the minutes (http://www.fit.vutbr.cz/FIT/AS/), which form part of the Faculty Information System.

doc. Ing. Jaroslav Zendulka, CSc.
Chairman AS FIT
II. 8  Student Organizations

The Student Chamber of the Academic Senate of the FIT represents the students of the FIT, is elected by the academic staff and co-operates closely with the Student Union of the FIT.

The Student Union of the FIT is an interest group of the FIT students. It is here to inform students about important activities and events at the FIT, and about all that is important for their successful study and life in Brno. It contributes to various events of the FIT or BUT.

**Activities of the Student Chamber of the Academic Senate of the FIT in 2005**

Student senators regularly attended the AS FIT meetings. They participated in the Economic and Legislative Committees of the Senate.

**Activities of the Student Union (SU) FIT in 2005**

The members of the SU participated in the FIT Open Day and contributed to the organization of the joint ball of the FIT and FEEC. They also helped to promote the faculty at the international trade fair of higher education and lifelong education called Gaudeamus. They also visited some secondary schools to inform secondary school students about possibilities of studying at the FIT.

The members of the SU helped to promote various faculty events, such as: a meeting with representatives of IBM, a meeting of students with candidates for the Rector s position, EEICT International competition, etc. The Student Union distributed their own T-shirts promoting the study at the FIT among the students. The SU representatives worked in the committees of the Students’ Creativity Conference.

For the third time, the SU prepared a brochure containing useful information on the study start-up for the first-year students. For the first time, the SU organized an event called *A drop of FIT blood*, i.e. a blood donation event. The SU also contributed to the organization of Majáles and provided several lectures on the Linux OS to show the first-year students interesting tips how to install and use this alternative OS.

Jan Kubíček
Chairman SCAS FIT
III. DEPARTMENTS AT THE FIT BUT IN 2005

III.1 Department of Information Systems

The Department of Information Systems provides tuition in the Master’s study programme with the specialization Information Systems, which covers programming, formal languages and translators, database and information systems, computer nets, formal specifications, and internet and distributed applications. The aim is to inform students about theory, technology and methods of information systems development and teach them to develop such systems based on modern tools, methods and technologies. Apart from that the Department also provides tuition in a large number of basics in the Bachelor’s study programme Information Technology and offers subjects in the Ph.D. study programme Information Technology.

Scientific and research activities of the Department are focused on database technology, implementation of information systems, management of software projects, theory of formal languages and compilers. The main areas of interest are the following ones:

- Object-oriented modelling, object-oriented database systems, database design
- Knowledge discovery in databases
- Formal specifications of reactive systems and real-time systems
- Computer networks and communication protocols
- Information system implementation
- Software metrics and control of software projects
- Formal languages and
- Functional languages

The lectures in most courses are accompanied by projects or laboratory sessions, where students acquire necessary skills and useful experience with the latest SW packages, and with solving SW projects, and where they learn team work and project management.

Staff

Head of Department
Zendulka Jaroslav, doc. Ing., CSc.

Deputy Head of Department
Meduna Alexander, prof. RNDr., CSc.

Professors
Honzík Jan M., prof. Ing., CSc.
Hruška Tomáš, prof. Ing., CSc.
Meduna Alexander, prof. RNDr., CSc
Švéda Miroslav, prof. Ing., CSc.

Associate Professors
Kolář Dušan, doc. Dr. Ing.
Zendulka Jaroslav, doc. Ing., CSc.

Assistant Professors
Burget Radek, Ing., Ph.D.
Kreslíková Jitka, RNDr., CSc.
Matoušek Petr, Ing., Ph.D.
Ryšavý Ondřej, Ing., Ph.D.

**Assistant Lecturers**
Bartík Vladimír, Ing., Ph.D.
Ráb Jaroslav, Ing.
Ščuglík František, Ing.

**Expert Technician**
Kurečka Radomír, Ing.

**Postgraduate Students**
Bidlo Radek, Ing.
Blatný Petr, Ing.
Čech Vladimír, Ing.
Holčápek Jan, Mgr.
Hrouzek Jan, Ing.
Chmelař Petr, Ing.
Kopeček Tomáš, Ing.
Křivka Zbyněk, Ing.
Kubát Lubomír, Ing.
Květoňová Šárka, Ing.
Lorenc Luboš, Ing.
Lukáš Roman, Ing.
Martinek Zdeněk, Mgr.
Masařík Karel, Ing.
Masopust Tomáš, Mgr.
Očenašek Pavel, Ing.
Petrucha Roman, Ing.
Rudolfová Ivana, Ing.
Rychlík Marek, Mgr.
Schönecker Rudolf, Ing.
Stryka Lukáš, Ing.
Techet Jiří, Ing.
Trchalík Roman, Mgr.
Vítek Martin, Ing.
Weiss Petr, Ing.
Zeman David, Ing.

**Equipment**

The Department uses the equipment of the Computer Centre. A new HW laboratory was built at the DIFS for practical teaching of computer nets and communication technologies within a FRVS (Higher Education Fund) project. Apart from the computer equipment the laboratory comprises active network elements (6 Cisco 2620 routers, 3 WS-29250-T switches, 2 Belkin Gigabit port switches, 2 HP Pro Curve switches, WiFi access points AP Belkin and Linksys), then net testers (5x Fluke Micromapper, 1x MicroScanner Pro, 1xCable IQ), high-performance HW analysers (2x NetTool Pro VoIP, 1x EtherScope, 1x OptiView WGA/GIG), and a WiFi analyser (Airmagnet Laptop Trio& Surveyor). Students of IPK and ISA courses had laboratory sessions to gain practice in cable connection, computer routing and local network forming, network service configuration (DHCP, DNS, a secure web, IPsec) and routing (static and dynamic – RIP).
The laboratory equipment will be used for tuition in further courses on networking in the MSc. study programme and courses of Cisco Network Academy.

### Tuition

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<th>Abbr.</th>
<th>Course</th>
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<td>Data Warehouses</td>
<td>Z</td>
<td>6</td>
<td>13-0-0-26-0</td>
<td>Bartík Vladimír, Ing., Ph.D. Kurečka Radomír,</td>
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<td>Ing. Meduna Alexander, prof. RNDr., CSc.</td>
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<td>MW1</td>
<td>Desktop MS Windows</td>
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<td>Meduna Alexander, prof. RNDr., CSc. Meduna</td>
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<td>Alexander, prof. RNDr., CSc.</td>
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<td>Formal Specifications of Computer-Based Systems</td>
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<td>INS</td>
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<td>39-0-12-0-14</td>
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<td>KPA</td>
<td>Communications in Computer Applications</td>
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<td>Švéda Miroslav, prof. Ing., CSc. Hruška Tomáš,</td>
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<td>MW4</td>
<td>MS Windows ISA and SQL Server</td>
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<td>Hruška Tomáš, prof. Ing., CSc.</td>
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<td>Computer Communication and Networks</td>
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<td>39-0-4-0-9</td>
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**Research Projects**

**Network Architectures for Embedded Systems**, GACR, GA102/05/0467, 2005-2007  
**Research leader:** Srovnal Vilém  
**Team leaders:** Bílek Jan, Švéda Miroslav

**Hitech Laboratory of Student’s Applied Projects**, FRVS MSMT, FR 3380/2005/A, 2005  
**Research leader:** Marušinec Jaromír  
**Team leader:** Hruška Tomáš
Innovation of Two Courses: Functional and Logical Programming and Post-Relational Databases, FRVS MSMT, FR 1246/2005/F1,2005
Research leader: Kolář Dušan

Integrated Approach to Education of DSP Students in the Field of Parallel and Distributed Systems
GACR, GA 102/05/H050,2005-2008
Research leader: Gruska Jozef
Team leader: Češka Milan

Research Project in Interactive Media, GACR, GA408/04/1370,2005
Research leader: Gajdoš Július
Team leader: Zendulka Jaroslav

Research leader: Švéda Miroslav
Team leaders: Hruška Tomáš, Zendulka Jaroslav

Specialized Laboratory for Teaching Computer Networks and Distributed Systems,
FRVS MSMT, FR 1567/2005/A,2005
Research leader: Zendulka Jaroslav
Team leader: Matoušek Petr

Research leader: Honzík Jan M.
Team leader: Křena Bohuslav

Research leader: Hanáček Petr
Team leaders: Cvrček Daniel, Hrubý Martin, Hruška Tomáš, Peringer Petr, Rábová Zdeňka

Design and implementation of embedded formal verification assistants in the NET framework, MSR, MS1412001, 2004-2005
Research leader: Švéda Miroslav
Team leaders: Bureš František, Ryšavý Ondřej, Ščuglík František

Research leader: Honzík Jan M.
Team leader: Zemčík Pavel

Optical network in national research and its new applications - Programmable hardware, CESNET, MSM6383917201, 2004-2010
Research leader: Novotný Jiří
Team leaders: Čejka Rudolf, Fučík Otto, Kořenek Jan, Martínek Tomáš, Matoušek Petr, Pečenka Tomáš, Smrčka Aleš, Vojnar Tomáš, Zemčík Pavel
Optimally Integrated Models of Modern Information Technologies, GACR, GA 201/04/0441, 2004-2006
Research leader: Meduna Alexander
Team leader: Kolář Dušan

Research leader: Opršal Zdeněk
Team leaders: Kreslíková Jitka, Zendulka Jaroslav

Co-operation

Co-operation in the Czech Republic

- Application Software, s.r.o.- RNDr.Lubomír Ptáček, co-operation in education and courses for the FIT, http://www.pocitacoveskoleni.cz
- FAYN.CZ, s r.o., Dalibor Kaláb – IP telephonie testing, www.fayn.cz
- Faculty of Informatics, Masaryk University Brno, prof. Jozef Gruska – co-operation in the field of formal specifications and education of doctoral students, http://www.fi.muni.cz
- Faculty of Informatics, Masaryk University Brno, Ing. Matej Lexa, Ph.D. - co-operation in the field of bioinformatics, http://www.fi.muni.cz/fi/
- Webia, s.r.o., Ing. Martin Woznica, topics of BSc. and diploma theses and consultations, http://www.webia.cz
- LBMS, s.r.o. Praha, František Solar, Strategic Account Manager, co-operation in the field of process management and application for the support of process management, http://www.lbms.cz
- STAVCERT, s.r.o. Praha, Ing. Jiřina Štěpánská, chief auditor QMS, EMS, co-operation in the field of quality assessing of the process of the development of information systems
with the aim of the system certification for the quality management, [http://www.stavcert.cz](http://www.stavcert.cz)

- ICZ a.s., Ing. Miroslav Rybníček, co-operation in the field of project management and application for the support of process management, [http://www.i.cz/](http://www.i.cz/)
- Department of Theatre and Interactive Media Studies, Masaryk University, Faculty of Arts, prof. PhDr. Július Gajdoš, Ph.D. – joint grant project "Research in Interactive Media, GACR, GA408/04/1370", [http://www.phil.muni.cz/udim/](http://www.phil.muni.cz/udim/)

### International Co-operation

- University of Arizona, Tuscon, Arizona, USA, prof. Jerzy Rozenblit – co-operation in the field of embedded systems and formal specifications, [http://www.ece.arizona.edu](http://www.ece.arizona.edu).
- Cisco Network Academy, Karol Kniewald – co-operation in the implementation of CCNA courses into the programme of tuition, [http://cisco.netacad.net](http://cisco.netacad.net).

### Visits to the Department

- Dr. Tomoyuki Yamakami (invited to lecture on: Quantum Public-Key Cryptosystems and Quantum Hardcore Functions), Japan Science and Technology Agency, JP, 1 day.
- James Breen (Director of Learning Services), InterSystems Corporation, Cambridge, USA, 1 day.
- Sebastian Huber (Senior Marketing Coordinator), InterSystems GmbH, Darmstadt, Germany, 1 day.

### Visits of Staff Members to Foreign Institutions

- Burger Tomáš, Mgr., American Association for Artificial Intelligence, Hyatt Regency Crystal City, Arlington, Virginia, US, 5 days
- Honzik Jan M., prof. Ing., CSc., Ministry of Education, Youth and Sports, Osnabrueck, DE, 4 days
- Honzik Jan M., prof. Ing., CSc., EUROPEAN COMMISSION, Bonn, DE, 4 days
- Honzik Jan M., prof. Ing., CSc., EUROPEAN COMMISSION, Glasgow, GB, 4 days
- Honzik Jan M., prof. Ing., CSc., New Horizons In Business and Industry, Korfu, GR, 6 days
- Honzik Jan M., prof. Ing., CSc., EUROPEAN COMMISSION, Halden, Harstad – Norway, NO, 8 days
- Honzik Jan M., prof. Ing., CSc., EUROPEAN COMMISSION, Istanbul, TR, 4 days
- Honzik Jan M., prof. Ing., CSc., Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, SK, 1 day
- Hruška Tomáš, prof. Ing., CSc., Faculty of Informatics and Information Technology, STU, Ilkovičova 3, Bratislava, SK, 1 day
- Hruška Tomáš, prof. Ing., CSc., Faculty of Informatics and Information Technology, STU, Ilkovičova 3, Bratislava, SK, 1 day
- Hruška Tomáš, prof. Ing., CSc., Siemens, Corporate Research and Development, Berlin, Germany, DE, 4 days
- Matoušek Petr, Ing., Ph.D., CHARME2005, Saarbrucken, DE, 7 days
- Matoušek Petr, Ing., Ph.D., Universidad Politécnica de Valencia, Valencie, ES, 5 days
- Meduna Alexander, prof. RNDr., CSc., Universidad de Valladolid, Valladolid, Spain, ES, 8 days
- Meduna Alexander, prof. RNDr., CSc., The 12th International Conference on Artificial Intelligence in Education, Amsterdam, NL, 7 days
- Meduna Alexander, prof. RNDr., CSc., 7th International Colloquium on Graph Theory, Hyeres, FR, 8 days
- Očenášek Pavel, Ing., Katholieke Universiteit Leuven, KU Leuven, BE, 26 days
- Očenášek Pavel, Ing., 1st European Conference on Computer Network Defence, Pontypridd, GB, 4 days
- Ryšavý Ondřej, Ing., Ph.D., Department of Computer Science and Engineering, Chalmers University of Technology, Gothenburg, SE, 15 days
- Ryšavý Ondřej, Ing., Ph.D., Microsoft Research Redmond, One Microsoft Way, Redmond, WA 98052, US, 6 days
- Ryšavý Ondřej, Ing., Ph.D., The 17th Nordic Workshop on Programming Theory, Copenhagen, DK, 4 days
- Ščuglík František, Ing., WSEAS Internat. Conference on Simulation, Modeling and Optimisation, Kanoni, Korfu, Greece, GR, 12 days
- Šveda Miroslav, prof. Ing., CSc., IEEE Computer Society, Greenbelt, Maryland, USA, US, 8 days
- Šveda Miroslav, prof. Ing., CSc., IEEE Computer Society, Cairo, EG, 9 days
- Vítek Martin, Ing., University of Iceland, Reykjavík, IS, 4 months
- Zendulka Jaroslav, doc. Ing., CSc., Faculty of Electrical Engineering and Informatics, Technical University of Košice, Košice, Letná 9, SK, 3 days

Agreements
- Kreslíková Jitka, RNDr., CSc., Agreement on Professional Aid, STAVCERT Praha, spol s r.o.
- A Bi-lateral Agreement on Student and Teacher mobilities within the Socrates/Erasmus Programme Made with La Universidad de Valladolid, http://www.uva.es/, ES
- An Agreement on Alignment of the FIT to the CNA programme (co-operation with ÚO Brno).

Membership in Organizations and Societies
- Honzík Jan M., prof. Ing., CSc.,
  - IGIP
  - IFIP
  - EUA-ECTS/DS National Coordinator
  - Member of the "National Council for Research and Development" Ministry of Education of the Slovak Republic
- Hruška Tomáš, prof. Ing., CSc.,
  - ACM
  - Czech and Slovak Simulation Society (CSSS)
• Kolář Dušan, doc. Dr. Ing.
  o ACM
• Kreslíková Jitka, RNDr., CSc.,
  o Czech Society for Quality
  o Project Management Association
  o Czech Electrotechnical Society
• Křivka Zbyněk, Ing.
  o CSSUG - Czech and Slovak Smalltalk Users Group
• Masopust Tomáš, Mgr.,
  o Union of Czech Mathematicians and Physicists
• Ryšavý Ondřej, Ing., Ph.D.,
  o IEEE Computer society
  o Formal Methods Europe (FME)
• Šeuglík František, Ing.,
  o IEEE
• Švec Jaroslav, Ing.,
  o The European Higher Education Society
• Švédov Miroslav, prof. Ing., CSc.,
  o IEEE Computer Society
  o IFIP
• Zendulka Jaroslav, doc. Ing., CSc.,
  o ACM
  o Czech and Slovak Simulation Society (CSSS)

Publications

Software:
Ryšavý, O., Šeuglík, F.: Vutbrmsr .NET class library, Brno, CZ, 2005

Lecture:

Matoušek, P.: Symbolic Data Structure Based on Intervals for Parametric Verification, Seminary UIFS, FIT BUT Brno, CZ, 2005, p. 30

Matoušek, P.: TReX and IF, ParaDiSe seminary, FI MU Brno, CZ, 2005, p. 38

Conference Proceedings:


Books:


Book Chapters:


Conference Articles:


**Journals:**

**Bednář, D., Kreslíková, J.:** Vol.2005, No. 7, CZ, pp. 10-12, ISSN 1210-9592

**Burget, R.:** JDO – persistent objects and Java, In: Interval.Hz - Webdesign and e-commerce, Vol. 2005, No. 155, Brno, CZ, p. 25, ISSN 1212-8651

**Lorenc, L., Meduna, A.:** Self-Reproducing Pushdown Transducers, In: Kybernetika, Vol. 2005, No. 4, CZ, pp.533-539, ISSN 0023-5954


**Matoušek, P.:** How to analyse throughput of a network?, In: CONNECT!, Vol. 2005, No. 11, Brno, CZ, pp. 7-8, ISSN 1211-3085

**Meduna, A., Lukáš, R.:** A Note on Iteratively Extendable Strings, In: Rostocker mathematisches kolloquium, Vol. 2005, No. 59, Rostock, DE, pp. 71-73, ISSN 0138-3248


**Ščuglík, F.:** Relation between UML2 Activity Diagrams and CSP algebra, In: WSEAS Transactions on Computers, Vol. 4, No. 10, Athens, GR, pp. 1234-1240, ISSN 1109-2750

**Ščuglík, F.:** Time Synchronization Possibilities in Wireless networks for Embedded Systems, In: WSEAS Transactions on Communications, Vol. 4, No. 11, Athens, GR, pp. 1215-1219, ISSN 1109-2742
Research Projects:


Dissertations:

Bartík, V.: Discovery of Association Rules from Relational Data, Brno, CZ, 2005, p. 89

Matoušek, P.: Symbolic Data Structure Based on Intervals for Parametric Verification, Brno, CZ, 2005, p. 99

Ryšavý, O.: Specifying and Reasoning in the Calculus of Objects, Brno, CZ, 2005, p. 95

Habilitations:

Kolář, D.: Pushdown Automata: Another Extensions and Transformations, Brno, CZ, FIT BUT, 2005, p. 76

Products:

Vutbrmsr .NET class library, 2005

Author: Ryšavý Ondřej

Seminars

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<td>21.2.2005</td>
<td>Presentation of the paper &quot;New language operations in formal language theory&quot; published in Schedae Informaticae vol. 13/2004, Kraków, Poland, ISSN 0860-0295</td>
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<td>28.2.2005</td>
<td>Are our Students Honest?</td>
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<td>7.3.2005</td>
<td>The State and Perspectives of E-learning at Czech Universities; Implementation of Learning Management System- M. Weiter</td>
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<td>14.3.2005</td>
<td>Association Rule Discovery From Relational Data (PhD. thesis presentation) - V. Bartík</td>
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<td>21.3.2005</td>
<td>Message Dispatch Problem within the Systems with Roles - Formalism, Approaches to the Solution - T. Burger</td>
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<td>11.4.2005</td>
<td>Using Ontologies to Access Control - R. Petrucha</td>
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<td>18.4.2005</td>
<td>System for design and simulation of microprocessors - K. Masařík, R. Lukáš</td>
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<td>25.4.2005</td>
<td>An introduction to categorical logic - J. Šlapal</td>
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<td>2.5.2005</td>
<td>Application of Knowledge Discovery methods in Texture Analysis - M. Heckel</td>
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9.5.2005 Symbolic data structure based on intervals for parametric verification - P. Matoušek
10.10.2005 Iteratively Extendable Strings - A. Meduna a R. Lukáš
17.10.2005 An Introduction to Bioinformatics - I. Rudolfová
24.10.2005 An Improvisation on the Mathematical Induction Theme - A. Meduna
7.11.2005 Proofs via Structural Induction - D. Kolář
14.11.2005 Self-plagiarism - V. Čech
21.11.2005 Brief OLAP introduction - J. Holčapek
28.11.2005 Quantum Public-Key Cryptosystems and Quantum Hardcore Functions - Tomoyuki Yamakami

Other Activities

- Organization of the "8th Information Systems Implementation and Modelling" (ISIM 2005). It is an international conference on theory, modelling techniques and tools, methods of information systems design and database systems.
- Commencement of the Cisco Network Academy programme at the FIT (Dr. Matoušek) and of the CCNA1, CCNA2, CCNA3 and CCNA4 courses in the academic year 2005/2006, accompanied by participation in the CCNA teachers training at the University of Defence, Brno.
- Prof. Švéda was a member of the IFIP WG10.1 group, of the organizational committee of IEEE Engineering of Computer-Based Systems (ECBS), of the FIT BUT Scientific Board, Study Branch Boards for Doctoral Studies at the FIT BUT, Study Branch Boards for Doctoral Studies at the FI MU, and boards for Bc. and MSc. study programmes of the FIT. Last year, he was a member of the programme committee of the IEEE ECBS conference, the programme committee of the IEEE/IFIP Joint Workshop on Formal Specification of Computer-Based Systems, Head of a section at the IEEE ECBS 2005, Greenbelt, Maryland, USA, and a member of the executive committee of the IEEE ICICT 2005 Conference, Cairo, Egypt.
- Prof. Honzík was a member of the national Bologna Promoters team, National Committee for Erasmus, an expert supervisor of the national Gaudeamus - Fair, a chairman of the advisory board of Gaudeamus - Fair, a member of 6 scientific boards of schools (BUT, OU) and faculties (FIT BUT, FP BUT, FI MU, FM TUL), and a member of a GACR subcommittee in 2005.
- Doc. Zendulka was a member of the evaluation board in Database Product 2005 competition organized by the journal of Databázový svět (Database World).
• Prof. Honzík was the chief executive of the evaluation board and prof. Hruška and doc. Zendulka were members of the academic part of the evaluation board of the Crystal Disc competition within the international trade fair on information technology INVEX 2005. Dr.Burget was in charge of information support.
• Dr. Kreslíková was a member of programme committees for PRONT 05 and PROMA 05 conferences dealing with Project Management.
• Dr. Bartík was a member of the programme committee of the Information Systems Implementation And Modelling (ISIM 2005) international conference.
• Prof. Hruška was a member of the programme committee for 8th Information Systems Implementation and Modelling conference, and the chairman of the programme committee for DATAKON 2005 Brno. He was a member of the Scientific Board of Brno University of Technology, of the Scientific Board of the Faculty of Information Technology BUT, of the Scientific Board of the Faculty of Electrical Engineering and Communications BUT, and of the Scientific Board of the Faculty of Applied Sciences, WBU in Plzeň
• Dr.Burget was a member of programme committees for DATAKON 2005, WebS 2005, and RAWS 2005.
• Ing.Ráb was involved in the Gregor-Mendel-Bioinfonet project financed from a PHARE grant worked on by Mendel Museum and IMP Vienna.
III.2 Department of Intelligent Systems

The Department of Intelligent Systems provides tuition of subjects for the Intelligent Systems specialization. This specialization synthesizes knowledge from several scientific areas: classical artificial intelligence, system modelling, simulation and formal analysis over system models, neural networks, genetic algorithms and fuzzy systems. The common features here are the non-traditional ways of computing that enable solving extremely complex problems, uncertainties and dynamism of processes in progress.

The graduates will become experts in system modelling and creation, in signal recognition (speech and visual image processing), processing of natural language and decision-making based on inaccurate and incomplete information. They will also master intelligent control systems, intelligent information systems and intelligent robots.

The research activity of the Department covers first of all intelligent systems, but attention is also paid to systems for specific applications, computer-based systems, interface design and the use of multi-level parallelism. Further fields of interest are: integration of components into embedded applications, simulation and prototyping of different configurations, and formal specification and verification of the design.

Most subjects are accompanied with projects or laboratory sessions so that students might acquire practical skills and experience with the latest software products and systems.

Staff

Head of the Department
Hanáček Petr, doc. Dr. Ing.

Deputy Head of the Department
Rábová Zdeňka, doc. Ing., CSc.

Professors
Češka Milan, prof. RNDr., CSc.

Associate Professors
Hanáček Petr, doc. Dr. Ing.
Kunovský Jiří, doc. Ing., CSc.
Rábová Zdeňka, doc. Ing., CSc.
Zbořil František, doc. Ing., CSc.

Assistant Professors
Cvrček Daniel, Ing., Ph.D.
Drahanský Martin, Ing., Ph.D.
Hrubý Martin, Ing. Ph.D.
Janoušek Vladimir, Ing., Ph.D.
Koči Radek, Ing., Ph.D.
Křena Bohuslav, Ing., Ph.D.
Marek Vladimir, Ing.
Orság Filip, Ing., Ph.D.
Peringer Petr, Dr. Ing.
Vojnar Tomáš, Ing., Ph.D.
Zbořil František Jr., Ing.. Ph.D.
Assistant
Kumpošt Marek, Mgr.
Martinek, David, Ing.

Ph.D. Students
Erlebach Pavel, Ing.
Florián Vladimír, Ing.
Grulich Lukáš, Ing.
Jurka Pavel, Ing.
Malinka Kamil, Mgr.
Mazal Zdeněk, Ing.
Novosad Petr, Ing.
Polášek Petr, Ing.
Pospíšil Dominik, Mgr.
Rogalewicz Adam, Mgr.
Rozman Jaroslav, Ing.
Skřivánek Roman, Ing.
Slavíček Pavel, Ing.
Smrčka Aleš, Ing.
Turakhodjaeva Nasibakhon
Vintera Jiří, Ing.

Equipment
The Department uses the equipment of the Computer Centre

Tuition

<table>
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<tr>
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<td>Rábová Zdeňka, doc. Ing., CSc.</td>
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**Research Projects**

**Brno University Security Laboratory**, UNKNOWN, BUSLab, 2005  
**Research leader:** Cvrček Daniel, Hanáček Petr, Matýáš Václav Jr., Říha Zdeněk, Staudek Jan

**Integrated Approach to Education of Ph.D. Students in the Area of Parallel and Distributed Systems**, GACR, GA 102/05/H050, 2005-2008  
**Research leader:** Gruska Jozef  
**Team leader:** Češka Milan

**Research leader:** Honzík Jan M.  
**Team leader:** Křena Bohuslav

**Automated methods and tools supporting development of reliable parallel and distributed systems**, GACR, GA102/04/0780, 2004-2006  
**Research leader:** Češka Milan  
**Team leaders:** Haša Luděk, Janoušek Vladimír, Kočí Radek, Křena Bohuslav, Rábová Zdeňka, Vojnar Tomáš

**Information system security - research of attacks on tamper-resistant cryptographic hardware**, GACR, GA102/04/0871, 2004-2006  
**Research leader:** Hanáček Petr  
**Team leaders:** Cvrček Daniel, Hruška Tomáš, Peringer Petr, Rábová Zdeňka
Research leader: Hanáček Petr
Team leader: Cvrček Daniel

Research leader: Křena Bohuslav

Optical network in national research and its new applications - Programmable hardware, CESNET, MSM6383917201, 2004-2010
Research leader: Novotný Jiří
Spoluřešitelé: Čejka Rudolf, Fučík Otto, Kořenek Jan, Martinek Tomáš, Matoušek Petr, Pečenka Tomáš, Smrčka Aleš, Vojnar Tomáš, Zemčík Pavel

Advanced Methods of Automatic Verification of Parametric and Infinite-State Systems, GACR, GA102/03/D211, 2003-2006
Research leader: Vojnar Tomáš
Team leader: Češka Milan

Co-operation

Co-operation in the Czech Republic
- Faculty of Informatics, Masaryk University Brno
- Department of Computers FEL, ČVUT Praha
- Department of Computer Science and Engineering WBU in Plzeň
- Energy institute EGU Brno, a.s.
- Institute of Process and Environmental Engineering DSI, BUT in Brno
- Artisys, s.r.o., Brno, Dana Brhelová, http://www.artisys.cz
- Monet+ s.r.o., Zlín, Ing. Endrys
- Department of Informatics FEI, VŠB - Technical University Ostrava
- Grisoft, s.r.o., Brno, http://www.grisoft.cz

International Co-operation
- DISCo, Universita degli Studi di Milano, Milano, IT, Testing and Analysis Laboratory, prof. Mauro Pezze – co-operation in the field of formal analysis and verification, http://www.lta.disco.unimib.it
- TU Košice, Košice, SK, co-operation in various fields of research, http://www.tuke.sk
- University of Malta, MT, co-operation in modelling and simulation, http://www.um.edu.mt
• ComputerLab, Cambridge University, GB, co-operation in the field of security of bank cards, http://www.cl.cam.co.uk

Visitors to the Department
• Prof. Bouajjani, LIAFA, Université Paris 7 - Denis Diderot/CNRS – Regular Symbolic Analysis of Dynamic Networks of Pushdown Systems
• O. Nezhya, Digitus, s.r.o., Přerov – a lecture on biometric systems

Visits of Staff Members to Foreign Institutions
• Cvrček Daniel, Ing., Ph.D., Johann Wolfgang Goethe Universitat, Berlin, DE
• Cvrček Daniel, Ing., Ph.D., European Union, Brussels, BE
• Drahanský Martin, Ing., Ph.D., Universität Siegen, FB12, Institut für Messtechnik, DE
• Erlebach Pavel, Ing., Laboratoire d'Informatique Algorithmique: Fondements et Applications, Université Paris 7/CNRS, UMR 7089, LIAFA, CNRS, UMR 7089, Université Paris 7, FR
• Křena Bohuslav, Ing., Ph.D., Universita degli Studi di Milano - Bicocca; Dipartimento di Informatica, Sistemiatica e Comunicazione; Laboratorio di Test e Analisi del Software, Universita degli Studi di Milano-Bicocca, Via Bicocca degli Arcimboldi 8, 20126, Milano, IT
• Křena Bohuslav, Ing., Ph.D., Galileo Avionica S.p.A., Via A. Einstein 35, Campi Bisenzio, 50018, IT
• Novosad Petr, Ing., Laboratoire d'Automatique de Grenoble, Laboratoire d'Automatique de grenoble, ENSIEG - Domaine Universitaire - BP46, 38402 Saint Martin d'Heres, FR
• Rogalewicz Adam, Mgr., Laboratoire d'Informatique Algorithmique: Fondements et Applications, Université Paris 7/CNRS, UMR 7089, LIAFA, 175 rue du Chevaleret 75013 Paris, FR
• Vojnar Tomáš, Ing., Ph.D., Laboratoire d'Informatique Algorithmique: Fondements et Applications, Université Paris 7/CNRS, UMR 7089, LIAFA, 175 rue du Chevaleret 75013 Paris, FR

Agreements
• An agreement on co-operation in research of automatic verification methods for systems with a complex and dynamically changing structure and for systems with advanced qualitative behaviour features with LIAFA, Université Paris 7 - Denis Diderot/CNRS, http://www liafa.jussieu.fr, FR
• A bilateral agreement on co-operation within the Socrates/Erasmus programme made with Universität Siegen, Germany

Membership in Organizations and Societies
• Češka Milan, prof. RNDr., CSc.
  o TC 10 IFIP Committee – Computer systems technology
  o IFIP WG 10.1 Computer Aided System Theory
  o Editorial Board of International Journal of General Systems, Gordon and Breach Science Publisher, USA
  o Research Board of Advisors, American Biographical Institute
  o Gesellschaft für Informatik, Germany
• CSSS – Czech and Slovak Simulation Society within EUROSIM
• ACM – SIGSAC – Special Interest Group on Security, Audit and Control

Hanáček Petr, doc. Dr. Ing.
• CIS – Czech and Slovak Information Society
• CSSS – Czech and Slovak Simulation Society within EUROSIM
• ACM – SIGSAC – Special Interest Group on Security, Audit and Control
• CEO – Centre for Electronic Commerce

Janoušek Vladimír, Ing., Ph.D.
• CSSS – Czech and Slovak Simulation Society within EUROSIM

Peringer Petr, Dr. Ing.
• CSSS - Czech and Slovak Simulation Society within EUROSIM

Rábová Zdeňka, doc. Ing., CSc.
• CSSS – Czech and Slovak Simulation Society within EUROSIM
• AFCEA

Vojnar Tomáš, Ing., Ph.D.,
• Editorial Board of CAI

Zbořil František, doc. Ing., CSc.,
• CSSS – Czech and Slovak Simulation Society within EUROSIM

Publications:

Lectures:


Books:


Book Chapters:


Rábová, Z.: Modelling and Simulation Education and Research at Faculty of Information Technology (FIT), Brno University of Technology (BUT), Simulation Almanac 2005, Praha, CZ, FEL ČVUT, 2005, pp. 9-11, ISBN 8001033228

Conferences:


Cvrček, D., Matyáš, V., m.: PIN (&Chip) or signature - beating or cheating?, In: SPW 05 Proceedings, Berlin, DE, Springer, 2005, p. 5, ISSN 0302-9743


Journals:


Cvrček, D., Matyáš, V., m., Patel, A.: Evidence processing and privacy issues in evidence-based reputation systems, In: Computer Standards & Interfaces, Vol. 27, No. 5, NL, pp. 533-545, ISSN 0920-5489

Drahanský, M., Orság, F.: Can biometrics be used for cryptography?, In: Crypto-world, Vol. 7, No. 11, Praha, CZ, pp. 13-18, ISSN 1801-2140


Research Projects:


Dissertations:

Drahanský, M.: Biometric Security Systems - Fingerprint Recognition Technology, Brno, CZ, 2005, s. 140

Seminars:

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<td>17. 2. 2005</td>
<td>Security – Dan Cvrček</td>
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<td>24. 2. 2005</td>
<td>LIAFA (info) – Tomáš Vojnar</td>
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<td>10. 3. 2005</td>
<td>Modeling of Human Activity (overview) – Lukáš Grulich</td>
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<td>Robot Navigation - Jaroslav Rozman</td>
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<td>17. 3. 2005</td>
<td>Hybrid Petri Nets – Novosad Petr</td>
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<td>24. 3. 2005</td>
<td>Liberouter – Jan Kořenek</td>
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<td>31. 3. 2005</td>
<td>Methods and Tools of Indeterminateness Description in the Heterogeneous Models – David Martinek</td>
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<td>Distributed PNtalk with Mobile Objects – Ivan Schwarz</td>
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<td>14. 4. 2005</td>
<td>Distributed Simulation Environment – Pavel Slavíček</td>
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<td>28. 4. 2005</td>
<td>OOPN-DEVS (Janoušek, Kočí)</td>
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<td>5. 5. 2005</td>
<td>Modeling of the Liberouter System to Purpose of the Verification and/or Simulation Prove of the Performance Parameters - Aleš Smrčka</td>
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</table>
### Other activities


- Co-organization of the international students’ „Honeywell EMI Conference and Competition“ supported by Honeywell (EMI 2005).


- Memberships in programme committees of international scientific conferences.


- „Brno University Security Laboratory“ (BUSLab). A research group co-operating with FI MU Brno and FIT BUT on the analysis and development of security applications.

- Co-organization of the „Mikulášská kryptobesídka 2005“ international workshop focused on security in IT.
III.3 Department of Computer Graphics and Multimedia

The Department of Computer Graphics and Multimedia is responsible for teaching courses in the MSc. specialization called Computer Graphics and Multimedia, which covers computer graphics and multimedia, speech processing, human-machine interfaces, image and sound processing and compression, application interfaces for computer graphics and multimedia, and basics of applied computer graphics disciplines, such as computer-aided design (CAD), geographic information systems, etc. The Department of Computer Graphics and Multimedia is also responsible for teaching Signals and Systems, Computer Graphics Basics and Human-Machine Interface Design courses in Information Technology Bc programme.

Research activities of the Department are mainly focused on general computer graphics algorithms, rendering, processing and recognition of speech signals, animation in three-dimensional space, modern methods of human-machine interaction, image and signal processing, medical data processing, and on applications. The main research topics from the above activities are:

- Computer graphics algorithms accelerated using DSP and FPGA,
- perceptually-based robust feature extraction for speech and speaker recognition
- very low bit rate coding
- realistic rendering of complex scenes and volume rendering,
- automatic determination of speech units
- large scale speech database collection
- animation of articulated structures, kinematics and dynamics,
- medical data processing and visualization and human body modelling reconstruction from VH data sets,
- parallel rendering implementation of signal processing and graphics algorithms.

The lectures in most courses are supplemented with projects and laboratory sessions where the knowledge that students acquire during the lectures is further developed through practical experience and then practised in individually assigned projects and/or team projects. Most of the laboratory assignments and projects are platform-independent.

In case of complex tasks, which need specialized equipment, the necessary equipment, such as high performance Silicon Graphics graphic stations and specialized peripheries, is available.

Staff

Head of the Department
Zemčík Pavel, doc. Dr. Ing.

Deputy Head of the Department
Černocký Jan, doc. Dr. Ing.

Associate Professors
Černocký Jan, doc. Dr. Ing.
Zemčík Pavel, doc. Dr. Ing.

Research Worker
Matějka Pavel, Ing.
Assistant Professor
Burget Lukáš, Ing., Ph.D.
Herout Adam, Ing., Ph.D.
Kršek Přemysl, Ing., Ph.D.
Motlíček Petr, Ing., Ph.D.
Smrž Pavel, RNDr., Ph.D.
Sumec Stanislav, Ing., Ph.D.

Assistant Lecturer
Dobšík Martin, Ing.
Grézl František, Ing.
Karafiát Martin, Ing.

Technical Staff
Otáhalová Sylva

Ph.D. Students
Beran Vítězslav, Ing.
Glembek Ondřej, Ing.
Chalupníček Kamil
Chudý Robert, MgA.
Kadlec Jaroslav, Ing.
Pečiva Jan, Ing.
Potůček Igor, Ing.
Seeman Michal, Ing.
Sinopalniková Anna, Mgr.
Svojanovský Petr, Ing.
Szöke Igor, Ing.
Šilhavá Jana, Ing.
Španěl Michal, Ing.
Venera Jiří, Ing.

Equipment
- 3D Minolta VIVID 800 scanner for automatic scanning of objects up to the size of 1x1x1m with a computer-controlled revolving table for manipulation with the scanned objects. The scanner is connected to the Silicon Graphics Octane workstation.
- Software called SPEL - Speech Processing Electronic Library specialized IEEE software for speech signal processing.
- CAMEA DX6 with DSP TI C6711 and FPGA Virtex E-300 for acceleration of graphical computing.
- CAMEA UN11-P-VUT with DSP TI C6416 and FPGA Virtex II-500 for acceleration of raster image processing.
- Equipment for meeting recording with a camcorder, hyperbolic mirror (for 360 angle), four microphones, and a notebook.
- Rapid prototyping equipment (3D printer) Z310 by Z-corporation for making 3D models of human tissues based on medical diagnostic image systems (CT/MR)
### Tuition

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<td>ZPD</td>
<td>Natural language processing</td>
<td>Z</td>
<td>0</td>
<td>39-0-0-0-0</td>
<td>Smrž Pavel, RNDr., Ph.D.</td>
</tr>
</tbody>
</table>
Research Projects

Quality check of annotations of meeting data., FRVŠ MŠMT, FR3559/2005/G1, 2005
Research leader: Chalupníček Kamil
Team leader: Černocký Jan

Laboratory for image and sound, FRVŠ MŠMT, FR3521/2005/A, 2005
Research leader: Zemčík Pavel
Team leaders: Černocký Jan, Kršek Přemysl, Richter Miroslav Stanislav, Španěl Michal, Zemčík Pavel

New trends in research and use of voice technologies, GAČR, GA102/05/0278, 2005-2007
Research leader: Černocký Jan
Team leaders: Burget Lukáš, Grézl František, Chalupníček Kamil, Karafiát Martin, Matějka Pavel, Motlíček Petr, Schwarz Petr, Szöke Igor

Recognition and tracking of human body parts, FRVŠ MŠMT, FR2192/2005/G1, 2005
Research leader: Potůček Igor
Team leader: Zemčík Pavel

User interface of hierarchic structures, FRVŠ MŠMT, FR200/2005/G1, 2005
Research leader: Kadlec Jaroslav
Team leaders: Chudý Robert, Zemčík Pavel

Application of segmentation technologies for reconstruction of 3D models of objects from image, FRVŠ MŠMT, FR59/2005/G1, 2005
Research leader: Beran Vítězslav
Team leaders: Kršek Přemysl, Španěl Michal

Augmented Multi-party Interaction, EU-HLT, 506811-AMI, 2004-2006
Research leader: Heřmanský Hynek
Team leaders: Burget Lukáš, Černocký Jan, Grézl František, Kadlec Jaroslav, Karafiát Martin, Karafiát Martin, Matějka Pavel, Motlíček Petr, Pečiva Jan, Potůček Igor, Schwarz Petr, Sumec Stanislav, Španěl Michal, Zemčík Pavel

Research leader: Honzík Jan M.
Team leader: Zemčík Pavel

Optical network in national research and its new applications - Programmable hardware, CESNET, MSM6383917201, 2004-2010
Research leader: Novotný Jiří
Team leaders: Čejka Rudolf, Fučík Otto, Kořenek Jan, Martinek Tomáš, Matoušek Petr, Pečenka Tomáš, Smrčka Aleš, Vojnar Tomáš, Zemčík Pavel

Rapid prototyping tools for development of HW-accelerated embedded image- and video-processing applications, GA AVČR, 1ET400750408, 2004-2008
Research leader: Zemčík Pavel
Research leader: Mutliček Petr
Team leaders: Karafiát Martin, Kašpárek Tomáš, Sumec Stanislaw

Data driven anthropic coding and speech recognition, GACR, GP102/02/D108, 2002-2005
Research leader: Černocký Jan

Multi Modal Meeting Manager, EU-HLT, IST-2001-34485, 2002-2005
Research leader: Heřmanský Hyněk
Team leaders: Černocký Jan, Zemčík Pavel

Co-operation

Co-operation in the Czech Republic
- Faculty of Informatics MU Brno, doc. Karel Pala, Dr. Ivan Kopeček, Dr. Tomáš Staudek – co-operation in speech processing and computer graphics
- VŠB-TU, Ostrava, Faculty of Electronics and Informatics, Dr. Arnošt Šarman – annual series of lectures given by the staff and Ph.D. students of ÚPGM, VŠB-TU – focus on computer graphics
- Centre for Machine Perception, FELK ČVUT Praha, Dr. Jiří Matas – co-operation on image processing related to transport
- ÚTIA Praha, Dr. Jaroslav Kadlec, Ing. Jan Schier - co-operation in the field of algorithm implementation for image processing in FPGA
- St. Anne Faculty Hospital, Brno, Clinic of Imaging Methods, Head of the Clinic doc. MUDr. Petr Krupa – co-operation in the field of computer models of tissues, Clinic of Stomatology, Clinic of Plastic and Aesthetical Surgery, Clinic of Traumatology – co-operation in the field of computer models of tissues
- Clinic of Traumatology, Traumatological Hospital, Brno, Head: doc. MUDr. Michal Mašek, CSc – co-operation in the field of computer models of tissues

International Co-operation
- University of Bristol, Bristol, UK, Department of Computer Science, Dr. Alan Chalmers – co-operation in the area of computer graphics, exchange of Ph.D. students
- University of Surrey, Guildford, UK, Centre for Vision, Speech, and Signal Processing, prof. Josef Kittler, Dr. William Christmas – image processing, exchange of Ph.D. students
- University of Helsinki, Helsinki, Finland, Laboratory of Computational Engineering, prof. Mikko Sams, Dr. Michael Frydrych – co-operation in the area of man-machine communication, exchange of Ph.D. students
- Lappeenranta University of Technology, Lappeenranta, Finland, prof. Heikki Kälviäinen, prof. Jan Voráček – image processing, exchange of students, and MSc. Study in Finland within the framework of IMPIT Project (International Master’s Programme in Information Technology)
- University of Joensuu, Joensuu, Finland, Department of Computer Science, prof. Jussi Parkkinen, Dr. Markku Hauta-Kasari – multispectral colour image processing, exchange of students
- Technische Universität Wien, Institut für Komputergrafik, Thomas Theufl – Annual international students’ seminar (Central European Seminar on Computer Graphics)
Technische Universität Graz, Institut für Computer Graphics and Vision, Markus Grabner, exchange of students and CESGC (Central European Seminar on Computer Graphics) - an annual international students’ seminar,

Oregon Health and Science University, Oregon Graduate Institute, Oregon, USA, prof. Misha Pavel – speech processing, robust detection of phonemes,


Department of computer graphics and image processing, Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, Slovak Republic, Dr. Andrej Ferko – Annual international students‘ seminar CESCG (Central European Seminar on Computer Graphics)

Visitors to the Department

• Dr. Alan Chalmers, University of Bristol, Department of Computer Science, Great Britain, 8.-9.5.2005
• Dr. Michael Frydrych, Helsinky University of Technology, Finland, 2 days in January 2005
• prof. Ralph M. Ford, Ph.D., Pennsylvnia State University, USA, January to June 2005

Visits of Staff Members to Foreign Institutions

• Beran Vítězslav, Ing., Faculty of Mathematics, Physics and Informatics, Comenius University, Budmerice, SK, 1 day
• Burget Lukáš, Ing., Ph.D., Institut Dalle Molle d’Intelligence Artificielle Perceptive, Rue du Simplon 4,Case Postale 592,CH-1920 Martigny, Switzerland, CH, 4 days
• Burget Lukáš, Ing., Ph.D., University of Edinburgh, Institute for Communicating and Collaborative Systems, Edinburgh, GB, 5 days
• Burget Lukáš, Ing., Ph.D., The 2005 NIST Language Recognition Evaluation, Gaithersburg, MD, US, 10 days
• Černocký Jan, doc. Dr. Ing., Philips Speech Processing, Breitner Tower,Room 20.14, Spaklerweg, Amsterdam, NL, 4 days
• Černocký Jan, doc. Dr. Ing., Institut Dalle Molle d’Intelligence Artificielle Perceptive, Place de Brouckère 31-1000 Brussels-Belgium, BE, 3 days
• Černocký Jan, doc. Dr. Ing., Ecole Superieure d’Engenieurs en Electrotechnique et Electronique, Cité Descartes BP 99, 93162 Nois-le-Grand, FR, 4 days
• Černocký Jan, doc. Dr. Ing., Institut Dalle Molle d’Intelligence Artificielle Perceptive, Martigny, Rue du Simplon 4, CH, 3 days
• Černocký Jan, doc. Dr. Ing., University of Edinburgh, Institute for Communicating and Collaborative Systems, University of Edinburgh, UK, GB, 7 days
• Černocký Jan, doc. Dr. Ing., Siemens, Corporate Research and Development, Mnichov, DE, 3 days
• Černocký Jan, doc. Dr. Ing., Eurospeech 2005 - Lisboa 9th European conference on speech communication and technology, Lisabon, PT, 6 days
• Černocký Jan, doc. Dr. Ing., Institut Dalle Molle d’Intelligence Artificielle Perceptive, IBIS Brussels Sainte Catherine, BE, 3 days
• Fědor Martin, Ing., International Conference on Graphics, Vision and Image Processing, Cairo, Egypt, EG, 6 days
• Herout Adam, Ing., Ph.D., University of Bristol, University of Bristol, Senate House, Bristol BS8 1TH, GB, 6 days
• Herout Adam, Ing., Ph.D., Lappeenranta University of Technology, Kinnarilankatu 34, FIN-53850, Lappeenranta, FI, 6 days
• Herout Adam, Ing., Ph.D., Universidade de Trás-os-Montes e Alto Douro, Apartado 1014,5000-911 Vila Real, PT, 8 days
• Herout Adam, Ing., Ph.D., International Conference on Graphics, Vision and Image Processing, Cairo, Egypt, EG, 6 days
• Chalupniček Kamil, 10th International Conference on Speech and Computer, University of Patras, Patras, Greece, GR, 6 days
• Kadlec Jaroslav, Ing., University of Edinburgh, Institute for Communicating and Collaborative Systems, Edinburgh, GB, 5 days
• Karafiát Martin, Ing., Institut Dalle Molle d'Intelligence Artificielle Perceptive, Rue du Simplon 4, Case Postale 592, CH-1920 Martigny, Switzerland, CH, 4 days
• Matějka Pavel, Ing., University of Edinburgh, Institute for Communicating and Collaborative Systems, University of Edinburgh, UK, GB, 8 days
• Matějka Pavel, Ing., Eurospeech 2005 - Lisboa 9th European conference on speech communication and technology, Lisabon, PT, 6 days
• Matějka Pavel, Ing., The 2005 NIST Language Recognition Evaluation, Gaithersburg, MD, US, 10 days
• Motlíček Petr, Ing., PhD., Eurospeech 2005 - Lisboa 9th European conference on speech communication and technology, Lisabon, PT, 6 days
• Pečiva Jan, Ing., Philips Speech Processing, Breitner Tower, Room 20.14, Spaklerweg, Amsterdam, NL, 3 days
• Pečiva Jan, Ing., The University of Twente, University of Twente, NL, 2 months
• Pečiva Jan, Ing., Intelligent Technologies for Interactive Entertainment, Madonna di Campiglio, IT, 5 days
• Potůček Igor, Ing., The Eighth International Conference on Computer Graphics and Artificial Intelligence, Limoges MSI, 83, rue d'Isle, Francie, FR, 4 days
• Potůček Igor, Ing., Visualization, Imaging, & Image Processing, Benidorm, ES, 6 days
• Smrž Pavel, RNDr., Ph.D., European Comission EU, Avenue d’Auderghem 22-28, Bussel, BE, 2 days
• Smrž Pavel, RNDr., Ph.D., Centrale Recherche S.A., rue Jean-Goujon, Paris, FR, 2 days
• Smrž Pavel, RNDr., Ph.D., European Comission EU, Avenue d’Auderghem 22-28, Bussel, BE, 2 days
• Smrž Pavel, RNDr., Ph.D., Open License Society, Leuven, Belgie, BE, 1 day
• Smrž Pavel, RNDr., Ph.D., ALMA Consulting Group, ALMA Consulting Group, 55, avenue René CASSIN, Lyon, FR, 3 days
• Smrž Pavel, RNDr., Ph.D., DG Joint Research Center - European Commission, Ispra, Itálie, IT, 3 days
• Smrž Pavel, RNDr., Ph.D., Computer processing of Slavonian and East European Languages, Bratislava, SK, 2 days
• Sumec Stanislav, Ing. Ph.D., The University of Twente, Drienerlolaan 5, Twente, NL, 2 days
• Svojanovský Petr, Ing., Summer School Neural Networks, Porto, PT, 7 days
• Szöke Igor, Ing., Ecole Superieure d'Engenieurs en Electrotechnique et Electronique, Cité Descartes BP 99, 93162 Nois-le-Grand, FR, 4 days
• Szöke Igor, Ing., University of Edinburgh, Institute for Communicating and Collaborative Systems, The University of Edinburgh, GB, 8 days
• Szöke Igor, Ing., Eurospeech 2005 - Lisboa 9th European conference on speech communication and technology, Lisabon, PT, 6 days
• Šilhavá Jana, Ing., Communication and Information Technologies, Hotel Tatranské Zruby, Starý Smokovec, SK, 4 days
• Zemčík Pavel, doc. Dr. Ing., European Commission EU, Avenue d’Auderghem 22-28, Bussel, BE, 1 day
• Zemčík Pavel, doc. Dr. Ing., University of Edinburgh, Institute for Communicating and Collaborative Systems, Edinburgh, GB, 2 days
• Zemčík Pavel, doc. Dr. Ing., Faculty of Mathematics, Physics and Informatics of Comenius University, Budmerice, SK, 1 day
• Zemčík Pavel, doc. Dr. Ing., University of Bristol, University of Bristol, Senate House, Bristol BS8 ITH, GB, 6 days
• Zemčík Pavel, doc. Dr. Ing., New Horizons In Business and Industry, Korfu, GR, 5 days
• Zemčík Pavel, doc. Dr. Ing., Lappeenranta University of Technology, Skinnarilankatu 34, FIN-53850, Lappeenranta, FI, 6 days
• Zemčík Pavel, doc. Dr. Ing., Institut Dalle Molle d’Intelligence Artificielle Perceptive, IBIS Brussels Sainte Catherine, BE, 3 days
• Zemčík Pavel, doc. Dr. Ing., International Conference on Graphics, Vision and Image Processing, Cairo, Egypt, EG, 6 days

Agreements
Co-operation agreements within the Socrates/Erasmus programme made with:

• Helsinki University of Technology, http://www.hut.fi/English/, Finland
• Lappeenrannan University of Technology, http://www.lut.fi/english/html, Finland
• University of Joensuu, http://www.joensuu.fi/englishindex.html, Finland
• École Supérieure d’Ingénieurs en Électrotechnique, http://www.esiee.fr/, France
• Universite la Rochelle, http://www.univ-lr.fr/, France
• Utrecht University, http://www.uu.nl/uupublish/homeuu/homeenglish/1757main.html, the Netherlands
• Universidade de Trás-os-Montes e Alto Douro, http://www.utad.pt, Portugal
• Graz University of Technology, http://www.tugraz.at/, Austria
• University of Surrey, http://www.surrey.ac.uk, UK
• University of Bristol, http://www.bris.ac.uk/, UK
• University of Sheffield, http://www.shef.ac.uk, UK

Membership in Organizations and Societies
• Černocký Jan, doc. Dr. Ing.,
  o IEEE (Secretary of the Czech Section)
  o ISCA (International Speech Communication Association).
• Motlíček Petr, Ing., Ph.D.
  o IEEE
  o ISCA
• Matějka Pavel, Ing.,
  o IEEE
  o ISCA
• Zemčík Pavel, doc. Dr. Ing.,
  o IEEE
  o ACM
• Szöke Igor, Ing.,
  o IEEE
• Schwarz Petr, Ing.
  o IEEE
  o ISCA
• Grézl František, Ing.
  o IEEE
  o Institutional membership in Linguistic Data Consortium,
    http://www.ldc.upenn.edu/.

Publications:

Presentations, Electronic Documents:


Conference Proceedings:


Conference Articles:


Journals:

Brázdil, M., Dobšík, M., Mikl, M., Hluštík, P., Daniel, P., Pažourková, M., Krupa, P.,


Kršek, P., Krupa, P.: 3D modelling of tissue based on medical image data, In: Neurologie pro praxi, Vol. 6, No. 3, Olomouc, CZ, s. 149-153, ISSN 1335-9592

Smrž, P.: Parallel Metagrammar for Closely Related Languages - A Case Study of Czech and Russian, Research on Language and Computation, Special Issue on Shared Representation in Multilingual Grammar Engineering, DE, 2005, s. 101-128

Research project:


Products:

AMI for Continuous Speech Recognition with a Large Dictionary, 2005
**Autoři:** Burget Lukáš, Hain Thomas, Karafiát Martin

Indexation and search engine for multi-modal data, 2005
**Autoři:** Černocký Jan, Fapšo Michal, Schwarz Petr, Szöke Igor

STK Toolkit, 2005
**Autoři:** Burget Lukáš, Černocký Jan, Glembek Ondřej, Karafiát Martin, Kontár Stanislav, Schwarz Petr

A System for Automatic Language Identification (LID), 2005
**Autoři:** Burget Lukáš, Černocký Jan, Matějka Pavel, Schwarz Petr

A System for On-line Detection of Keywords, 2005
**Autoři:** Černocký Jan, Matějka Pavel, Schwarz Petr, Szöke Igor

System for semi-automatic speech annotation checking using web interface, 2005
**Autoři:** Černocký Jan, Chalupniček Kamil, Kašpárek Tomáš

Seminars:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tr>
<td>7. 1. 2005</td>
<td>UTRAPs - Petr Svojanovský</td>
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<td>7. 1. 2005</td>
<td>Speaker segmentation and voice activity detection in meetings - Motlíček Petr</td>
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<td>7. 1. 2005</td>
<td>Control of the man-machine dialogue - Pavel Čenek</td>
</tr>
<tr>
<td>21. 1. 2005</td>
<td>Collaborative/Networked virtual environments - Pečiva Jan</td>
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<td>21. 1. 2005</td>
<td>Training of AMI CORE recognition system - Karafiát Martin</td>
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<tr>
<td>21. 1. 2005</td>
<td>WordNET - Karel Pala</td>
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<td>4. 2. 2005</td>
<td>Discriminative training of speech recognizers - Lukáš Burget</td>
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<td>4. 2. 2005</td>
<td>Visualisation of hierarchic structures - Kadlec Jaroslav</td>
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<td>4. 2. 2005</td>
<td>AMI meeting annotation checking using web interface (IN CZECH LANGUAGE) - Kamil Chalupniček</td>
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<tr>
<td>18. 2. 2005</td>
<td>RIPAC - the architectural overview and processing units - Pavel Zemčík</td>
</tr>
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<td>18. 2. 2005</td>
<td>Syntactic analysis of natural languages based on context free grammar backbone - Vladimír Kadlec</td>
</tr>
<tr>
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<tr>
<td>11. 3. 2005</td>
<td>Natural language as Web interface - Lukáš Svoboda</td>
</tr>
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<td></td>
<td>Demos prepared for the AMI Tech transfer workshop - Jan Černocký</td>
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<tr>
<td>1. 4. 2005</td>
<td>Results of acoustic keyword spotting on meeting data - Igor Szoke</td>
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<td>Language Identification - Pavel Matějka</td>
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<td>29. 4. 2005</td>
<td>Omni-directional image stabilization - Igor Potůček</td>
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<td>Advanced Human-Computer Interaction - Vítězslav Beran</td>
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<td>Algorithms on C6000 DSP Platform - Nikos Kontakis</td>
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<td>1. 7. 2005</td>
<td>Discrete Ergodic Hidden Markov Model Phoneme String Modeling in Language Identification - Pavel Matějka</td>
</tr>
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<td>1. 7. 2005</td>
<td>Keyword spotting by the use of semantic categories of words - Pandey Gaurav</td>
</tr>
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<td>Corner detectors and evaluation of their performance - Raphaël Escure and Benjamin Sebbah</td>
</tr>
<tr>
<td>22. 7. 2005</td>
<td>Structural language modeling - Pavel Smrž</td>
</tr>
<tr>
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<td>Omnidirectional system for meeting recordings - Igor Potůček</td>
</tr>
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<td>14. 10. 2005</td>
<td>Indexation and search engine for keyword spotting - Michal Fapšo</td>
</tr>
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<td>Computer animation of soft tissues - Martin Dobšík</td>
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<td>4. 11. 2005</td>
<td>Word association thesauri - Anna Sinopalnikova</td>
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<td>Language identification without sleep - Pavel Matějka &amp; Lukáš Burget</td>
</tr>
<tr>
<td>25. 11. 2005</td>
<td>Presentation of Activities: Prosody Prediction and Language Modelling - Ilya Oparin (Speech Technology center St. Peterburg, Russia and ZCU Plzen)</td>
</tr>
<tr>
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<td>Programming of cellular phones in Java - an application for reading of graphical codes by cellular phones - Josef Žižka</td>
</tr>
<tr>
<td>9. 12. 2005</td>
<td>Advances in keyword spotting in SPeech@FIT - Igor Szoke</td>
</tr>
<tr>
<td></td>
<td>Adaptive Delaunay Triangulation for Medical Image Segmentation - Michal Španěl</td>
</tr>
</tbody>
</table>
III.4 Department of computer systems

Department of Computer Systems provides tuition in the MSc. specialization Computer Systems and Networks which covers processor and computer architecture, data transmission, communication protocols and computer networks, development of network-based, Internet, parallel and embedded applications, design of hybrid HW/SW systems and their specification, digital signal processing, design of specialized interfaces, including interfaces to the Internet. Besides, the Department is also in charge of teaching a number of courses in the Bachelor’s study programme Information Technology.

Research activities of the Department are focused on architecture of HW/SW of embedded systems, parallel performance prediction and tuning, specification and design of computer-based systems, embedded systems and their mutual communication. Other research topics are: image processing and applied genetic and evolutionary algorithms, including evolvable hardware. The main areas of interest are the following:

- application-specific architectures: high-performance embedded systems, multiprocessor systems on a chip (MPSoC) and re-configurable systems,
- performance prediction and tuning of parallel applications (neural networks, large systems of linear equations, signal processing algorithms),
- evolvable digital architectures,
- formal approaches to digital circuit diagnostics,
- applied evolutionary algorithms, and
- diagnostics, testability and safety.

The lectures in most courses are supplemented with projects or laboratory sessions, where students acquire useful experience and skills with the latest software packages and hardware units (workstations, multiprocessor systems, workstation clusters, RT OS, design systems FPGA and the like), learn basics of teamwork and project management. For the most demanding projects IBM BladeServer is used.

Department seminars take place on Fridays at 1 p.m. in Room C21. Current programme.

Staff

Head of Department
Kotásek Zdeněk, doc. Ing., CSc.

Deputy Head of Department
Sekanina Lukáš, Ing., Ph.D.

Professors
Dvořák Václav, prof. Ing., DrSc.

Associate Professors
Drábek Vladimír, doc. Ing., CSc.
Kotásek Zdeněk, doc. Ing., CSc.
Linhart Miroslav, doc. Ing., CSc.
Schwarz Josef, doc. Ing., CSc.
Lecturers
Eysselt Miloš, Ing., CSc.
Fučík Otto, Dr. Ing.
Růžička Richard, Ing., Ph.D.
Sekanina Lukáš, Ing., Ph.D.
Strnadel Josef, Ing., Ph.D.

Ph.D. Students
Bidlo Michal, Ing.
Gajda Zbyšek, Ing.
Herrman Tomáš, Ing.
Jaroš Jiří, Ing.
Kobliha Miloš, Ing.
Kořenek Jan, Ing.
Kubek Ján, Ing.
Martínek Tomáš, Ing.
Ohlídal Miloš, Ing.
Pečenka Tomáš, Ing.
Škarvada Jaroslav, Ing.

Equipment

Laboratory of network architectures and applications
10 benches for development of advanced network architectures and applications, each equipped with a PC and a COMBO-PTM card. Further equipment: 2 Agilent oscilloscopes and 2 Textronix oscilloscopes (able to sample on 100MHz, 1G samples/channel), a logical analyser, 2 laboratory power sources, 5 digital multimetres, an MBT 250 soldering station, and a Bernstein tool kit.

Laboratory of Embedded Systems
6 benches equipped with FUJITSU DevKit16 for the development of advanced embedded applications including special peripheries in FPGA, and use of modern design systems “Processor Expert“, UNIS.

8 benches equipped with development kits HC11 EVBU for the development of simple embedded applications with the use of the most widely spread MCU Motorola.

20 benches equipped with development kits with HC08 microcontroller, FPGA, basic peripheries and interfaces for HW applications with Metrowerks CodeWarrior and Xilinx ISE Webpack - modern programmable support. 6 analog EZ Digital OS 5020 oscilloscopes that enable two-channel waveform display in the frequency range up to 20 MHz.

1 bench with Celoxica RC-1000 PCI card (Xilinx FPGA Virtex 1000) for FPGA gate array design.

Laboratory of DSP Systems
1 bench for developing DSP applications with DSP56000 processors, Motorola.

8 benches equipped with DSK6414 kits, Texas Instruments, for work with high-performance VLIW DSP processors TMS320C6414.
Computer Peripheral Laboratory

A bench for tuition support and development of PC fieldbuses – a special adapter (developed at the FIT), PCI Spartan fieldbus development kit with FPGA, Agilent 32-channel logic analyser.

An input peripheral devices bench – a keyboard and its controller (a special-purpose set-up for demonstration), a Genius NewSketch tablet, and a HP 5300C desktop scanner.

An output peripheral devices bench – an ink printer HP DesignJet 488CA with HPGL and PCL graphic languages, Roland x/y plotter with HPGL language.

A digital computer/analog environment interface – Cards with Advantech PCI 1710 A/D converters, Advantech switching network, a digital oscilloscope Agilent 54622A, and MS 9160 – a function generator and counter.

A digital interfaces bench - cards for PC / devices with RS-232, RS-485, RS-422, GPIB.

An external memory bench - interface and IDE a SCSI, SCSI-2 discs.

A bench for teaching kits development – memory programmer, programmable logic and processors Elene LabProg 48LV, soldering station, measuring instruments and power sources.

Compound digital system laboratory

20 benches equipped with development kits for design and debugging of digital systems and their interface. Each bench contains a Motorola HC08LJ12 kit with a microcontroller including common peripherals and debugging interface, Xilinx Spartan 3 kit with a gate array and an interface with numerous analogue and digital inputs and outputs (Advantech PCI-1710 industrial card), further peripherals, a bread board, JTAG programmer and a power supply unit.

Tuition

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Course</th>
<th>Sem</th>
<th>Cr.</th>
<th>Hours</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>EVA</td>
<td>Applied evolution algorithms</td>
<td>L 6</td>
<td>39-0-0-12-14</td>
<td>Schwarz Josef, doc. Ing., CSc.</td>
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<tr>
<td>AMC</td>
<td>Applied microcomputers</td>
<td>L 6</td>
<td>26-0-26-0-13</td>
<td>Schwarz Josef, doc. Ing., CSc.</td>
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<tr>
<td>ARP</td>
<td>Computer architectures</td>
<td>Z 6</td>
<td>39-16-0-0-10</td>
<td>Dvořák Václav, prof. Ing., DrSc.</td>
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<tr>
<td>IBX</td>
<td>Bachelor’s project abroad</td>
<td>L 9</td>
<td>0-0-0-0-78</td>
<td>Eysselt Miloš, Ing.,CSc.</td>
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<td>BPI</td>
<td>Bachelor’s project VTB</td>
<td>Z 6</td>
<td>0-0-0-0-78</td>
<td>Eysselt Miloš, Ing.,CSc.</td>
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<td>CZS</td>
<td>Digital signal processing</td>
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<td>DIA</td>
<td>Diagnostics and secure systems</td>
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<td>39-10-6-0-10</td>
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<td>Schwarz Josef, doc. Ing., CSc.</td>
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</table>
Research Projects

Network architectures for embedded systems, GAČR, GA102/05/0467, 2005-2007
Research leader: Srovnal Vilém
Team leaders: Bílek Jan, Švéda Miroslav

Evolutionary design of sorting and median networks using FPGA, FRVS MSMT, FR3042/2005/G1, 2005
Research leader: Kořenek Jan
Team leader: Sekanina Lukáš

Evolutionary design of testable circuits, FRVS MSMT, FR3041/2005/G1, 2005
Research leader: Pečenka Tomáš
Team leader: Kotásek Zdeněk

Integrated approach to education of DSP students in the field of parallel and distributed systems, GACR, GA102/05/H050, 2005-2008
Research leader: Gruska Jozef
Team leader: Češka Milan

Optimization processes in diagnostics of digital systems, GACR, GA102/05/P193, 2005-2007
Research leader: Strnadel Josef

New Structure and Modularity of Study Programmes at BUT, RP MSMT, MSMT 613/2005, 2005
Research leader: Drábek Vladimír

Utilization of evolutionary algorithms for implementation of adaptive image filters in FPGA, FRVS MSMT, FR2987/2005/G1, 2005
Research leader: Martinek Tomáš
Team leader: Sekanina Lukáš

IST Requalification of Disabled Persons CZ/04/B/F/NT-168025, CEVAPo BUT, 2004-2007
Research leader: Holec Petr
Team leader: Drábek Vladimír

Modern methods of digital systems synthesis/design, GACR, GA102/04/0737, 2004-2006
Research leader: Kotásek Zdeněk
Team leaders: Drábek Vladimír, Růžička Richard, Sekanina Lukáš, Strnadel Josef
Optical network in national research and its new applications - Programmable hardware, CESNET, MSM6383917201, 2004-2010

Research leader: Novotný Jiří

Team leaders: Čejka Rudolf, Fučík Otto, Kořenek Jan, Martinek Tomáš, Matoušek Petr, Pečenka Tomáš, Smrčka Aleš, Vojnar Tomáš, Zemčík Pavel

Rapid prototyping tools for development of HW-accelerated embedded image- and video-processing applications, GA AVCR, IET400750408, 2004-2008

Research leader: Zemčík Pavel

Formal approach to digital circuits test scheduling, GACR, GP102/03/P176, 2003-2005

Research leader: Růžička Richard

Application design methods based on evolvable hardware, GAČR, GA102/03/P004, 2003-2005

Research leader: Sekanina Lukáš

Co-operation

Co-operation in the Czech Republic

- Camea, s.r.o., Brno
- UNIS, s.r.o., Brno
- ASICentrum, Praha
- Institute of Informatics and Automation, AV ČR
- Department of Informatics FEI, Technical University of Mining and Metallurgy, Ostrava
- Computer Department FEL, Czech Technical University, Prague
- Department of Electrical Measurement, Technical University of Mining and Metallurgy, Ostrava
- Faculty of Mechatronics, Liberec University of Technology
- Faculty of Applied Sciences, University of West Bohemia, Plzeň
- Department of Computer Science, Masaryk University in Brno
- Cesnet

International Co-operation

- Institute of Informatics, Slovak Academy of Sciences
- Technical University in Tallin, Estonia
- Department of Informatics, University of Oslo, Norway
- Pennsylvania State University, The Behrend College, Erie, USA.
- Technical University in Riga, Latvia
- University of Aveiro, Portugal
- University of Wyoming, USA
- Dept. of Statistics, Operational Research and Computing, La Laguna University, Tenerife, Spain
- Computational Laboratory (CoLab), Swiss Federal Institute of Technology (ETH) Zürich, Switzerland
- ESIEE Amiens, France – co-operation in the field of student mobility,
- NASA Jet Propulsion Laboratory, Pasadena, USA
Visitors to the Department

- Dr. Ralph Ford, Pennsylvania State University (January to May 2005), Fulbright grant
- Arghaya Kumar Dhali, Indian Institute of Technology, (May to August 2005), cooperation in research
- Dr. Filip Železný, Computer Department FEL, Czech Technical University, Prague – a seminar held on 2nd December 2005

Visits of the Staff in Other Institutions

- Sekanina, L.: Evolvable Hardware. FEL, Czech Technical University, Prague (7th November, 2005) – a seminar
- Bidlo Michal, Ing., Genetic and Evolutionary Computation Conference, Loews L’Enfant Plaza Hotel, Washington, D.C. USA, US, 7 days
- Bidlo Michal, Ing., University of York, The University of York, Heslington, York YO10 5DD, UK, GB, 8 days
- Bidlo Michal, Ing., 1st Doctoral Workshop on Mathematical and Engineering Methods in Computer Science, Znojmo, CZ, 4 days
- Bidlo Michal, Ing., Computer architecture and diagnostics – A seminar for doctoral Ph.D. students, Lázně Sedmihorky, CZ, 3 days
- Crha Luděk, Ing., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, Hotel Sopron, HU, 4 days
- Drábek Vladimír, doc. Ing., CSc., University of Sofia St. Kliment Ohridski, James Baucher 5, Sofia 1164, BG, 5 days
- Dvořák Václav, prof. Ing., DrSc., Department of Computer Science, Trinity College, Cape Town International Convention Center, ZA, 5 days
- Dvořák Václav, prof. Ing., DrSc., Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brasil, BR, 12 days
- Jaroš Jiří, Ing., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, Hotel Sopron, HU, HU, 4 days
- Jaroš Jiří, Ing., The 20th International Symposium on Computer and Information Sciences, The Marmara Hotel, Istanbul, TR, 4 days
- Kořenek Jan, Ing., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, Hotel Sopron, HU, 4 days
- Kořenek Jan, Ing., International Conference on Evolvable Systems: From Biology to Hardware, Hotel Antemare, Sitges, Barcelona, Spain, ES, 5 days
- Kořenek Jan, Ing., 15th International Conference on Field Programmable Logic and Applications, Tampere Hall, Tampere, Finland, FI, 5 days
- Kotásek Zdeněk, doc. Ing., CSc., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, Hungary, HU, 4 days
- Kotásek Zdeněk, doc. Ing., CSc., Universita v Tallinu, Reval Hotel Olympia, Tallin, EE, 5 days
- Kotásek Zdeněk, doc. Ing., CSc., 8th EUROMICRO CONFERENCE ON DIGITAL SYSTEM DESIGN, Universidade do Porto, PT, 7 days
- Martinek Tomáš, Ing., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, Hungary, HU, 4 days
- Martinek Tomáš, Ing., International Conference on Evolvable Systems: From Biology to Hardware, Hotel Antemare, Sitges, Barcelona, Spain, ES, 5 days
- Martinek Tomáš, Ing., 15th International Conference on Field Programmable Logic and Applications, Tampere Hall, Tampere, Finland, FI, 5 days
• Martíněk Tomáš, Ing., Computer architecture and diagnostics – A seminar for doctoral Ph.D. students, Lázně Sedmihorky, CZ, 3 days
• Pečenka Tomáš, Ing., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, Hungary, HU, 4 days
• Pečenka Tomáš, Ing., 15th International Conference on Field Programmable Logic and Applications, Tampere Hall, Tampere, Finland, FI, 5 days
• Růžička Richard, Ing., Ph.D., Universita v Tallinu, Reval Hotel Olümpia, Tallinn, EE, 6 days
• Růžička Richard, Ing., Ph.D., 8th EUROMICRO CONFERENCE ON DIGITAL SYSTEM DESIGN, Faculdade de Engenharia da Universidade do Porto, Rua Dr. Roberto Frias, s/n, 4200-465 Porto, PT, 7 days
• Sekanina Lukáš, Ing., Ph.D., European Network of Excellence in Evolutionary Computing, Information Systems Department, University of Lausanne, CH - 1015 Lausanne, CH, 6 days
• Sekanina Lukáš, Ing., Ph.D., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, Hotel Sopron, HU, 4 days
• Sekanina Lukáš, Ing., Ph.D., International Conference on Evolvable Systems: From Biology to Hardware, Hotel Antemare, Sitges, Barcelona, Spain, ES, 5 days
• Strnadl Josef, Ing., Ph.D., The 8th IEEE Workshop on Design and Diagnostics of Electronic Circuits and Systems, Sopron, HU, 4 days
• Strnadl Josef, Ing., Ph.D., Faculty of Electrical Engineering and Informatics Slovak Technical University in Bratislava, Slovakia, Bratislava, Ilkovičova 3, 812 19 Bratislava, SK, 2 days

Membership in Organizations and Societies

• Drábek Vladimír, doc. Ing., CSc.,
  o IEEE - Computer Society
• Dvořák Václav, prof. Ing., DrSc.,
  o IEEE - Computer Society, since 1991
  o Editorial board of JUCS, Journal of Universal Computer Science, since 1994
  o Editorial board of JEE - Journal of Electrical Engineering, since 1996
• Eysselt Miloš, Ing., CSc.,
• Fučík Otto, Dr. Ing.,
  o IEEE - Computer Society
• Kotásek Zdeněk, doc. Ing., CSc.,
  o IEEE - Computer Society
• Růžička Richard, Ing., Ph.D.,
  o EvoNet - The European Network of Excellence in Evolutionary Computing
  o IEEE - Computer Society
• Sekanina Lukáš, Ing., Ph.D.,
  o IEEE - Computer Society
  o SIGEVO - ACM Special Interest Group for Genetic and Evolutionary Computation
  o EvoNet - The European Network of Excellence in Evolutionary Computing
• Schwarz Josef, doc. Ing., CSc.,
  o IEEE - Computer Society
  o EvoNet - The European Network of Excellence in Evolutionary Computing
  o IEEE - Neural Network Society, since 2004
• Strnadl Josef, Ing., Ph.D.,
  o a member of IEEE since 2004, and of IEEE Technical Council (TTTC - Test Technology Technical Council, TCRTS - Technical Committee on Real Time Systems, TCDA - Technical Committee on Design Automation) since 2005

Publications

Manuals:

Drábek, V.: The Entrance Examination at the Faculty of Information Technology in 2005-2006, Brno, CZ, FIT BUT, 2005, p. 16


Eysselt, M.: Study Programmes at the Faculty of Information Technology: IT - Information Technology, A Survey, MJ servis s.r.o., Brno, CZ, FIT BUT, 2005, p. 20

Chapters in Books:


Conference Articles:


Journals:


Sekanina, L.: Evolutionary Design Beats the Creative Designer (Evoluční design poráží řešení vytvořená kreativním návrhářem), In: Vesmír, Vol. 84, No. 1, CZ, pp. 44-46, ISSN 0042-4544


Research Projects:


Dissertations:

Mika, D.: Application of formal approaches for the design of digital circuit test controller, Brno, CZ, 2005, p. 144
### Seminars:

<table>
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<tr>
<th>Date</th>
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<tr>
<td>25. 1. 2005</td>
<td>Evolutionary circuit design in a field programmable transistor array FPTA – the experience from a stay with NASA Jet Propulsion Laboratory – Lukáš Sekanina</td>
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<td>27. 1. 2005</td>
<td>Evolutionary design of growing combinational circuits – Michal Bidlo. Evolutionary algorithms with a high degree of adaptation – Miloš Kobliha</td>
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<td>10. 2. 2005</td>
<td>Modeling and performance prediction of application-specific multiprocessor systems – Vladimír Kutálek</td>
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<td>25. 3. 2005</td>
<td>My first attempts to use the genetic algorithms in the License Plate Detection project – Luděk Crha</td>
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<td>1. 4. 2005</td>
<td>Instruction-based development – new results and their evaluation – Michal Bidlo. Adaptation of EDA algorithms to the changes in fitness – Miloš Kobliha</td>
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<td>8. 4. 2005</td>
<td>IP cores testing for SoC – Ján Kubek. Operations over a formal model and a testable core – Tomáš Herrman</td>
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<td>29. 4. 2005</td>
<td>Power consumption during test application of digital circuits – Jaroslav Škarvada. Dependency modeling in OS with graphs/Acceleration card driver – Tomáš Kašpárek</td>
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<td>6. 5. 2005</td>
<td>Solving hard combinatorial problems using EDA evolutionary algorithms) – Jiří Jaroš. Parallel hybrid evolutionary algorithms applied to hard combinatorial problems – Miloš Ohlídal</td>
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<td>19. 5. 2005</td>
<td>Tools and methods for automatic development of benchmark circuits – Tomáš Pečenka</td>
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<td>10. 10. 2005</td>
<td>Introduction of new PhD students - Ing. Zbyšek Gajda, Ing. Lukáš Stareček</td>
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<td>Tools and methods for automatic development of benchmark circuits – Tomáš</td>
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<td>Pečenka</td>
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<td>11. 11. 2005</td>
<td>Test scheduling of embedded systems reflecting components power</td>
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<td>consumption – Jaroslav Škarvada.</td>
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<td>IP softcores analysis based on finite automata – Ján Kubek</td>
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<td>2. 12. 2005</td>
<td>Machine learning for genome data analysis – Filip Železný, FEL ČVUT</td>
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<td>A new approach to the AAB group communication scheduling oriented to</td>
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<td>the conflict prediction– Miloš Ohlídal</td>
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<td>16. 12. 2005</td>
<td>Novel efficient evaluation of sequence and structure similarity in</td>
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<td>bioinformatics using programmable hardware – Tomáš Martínek.</td>
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<td>Fast search for regular expressions using an FPGA – Jan Kofenek</td>
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**Other activities:**

- Bidlo Michal, Ing., prof. Hlavička Prize for an outstanding paper Computer Architectures and Diagnostics 2005 (performed in Sedmihorky seminar)
- Kofenek Jan, Ing., Martíněk Tomáš, Ing., Pečenka Tomáš, Ing., the final review of the SCAMPI project, and a demonstration of hardware for 10Gps net monitoring, January 2005
- Kotásek Zdeněk, doc. Ing., CSc., a section moderator at IEEE European Test Symposium 2005 (Tallin, Estonia)
- Kotásek Zdeněk, doc. Ing., CSc., a member of the programme committee of the Dependability and Testing of Digital Systems section at DSD 2005 (Portugal)
- Sekanina Lukáš, Ing., PhD. and Ing. Michal Bidlo, Merit Award in Human Competitive Awards 2005 (Washington D.C.) and a prize for the best article at the 2nd European Workshop on Evolutionary Computation in Hardware Optimisation EvoHOT 2005, Lausanne
- Sekanina Lukáš, Ing., PhD., the head of the section and panel presenter at the 2005 NASA/DoD Conference on Evolvable Hardware (Washington DC) and the International Conference on Evolvable Systems: From Biology to Hardware (Barcelona)
- Sekanina Lukáš, Ing., PhD., The BUT Rector’s Award for outstanding pedagogical and scientific achievements in 2005
- Sekanina Lukáš, Ing., PhD., membership in the following programme committees:
  - IEEE Congress on Evolutionary Computation - CEC 2005 (Edinburgh, UK)
  - International Conference on Evolvable Systems: From Biology to Hardware - 2005 (Barcelona, Spain)
  - European Conference on Genetic Programming - EuroGP 2005 (Lausanne, Switzerland)
  - European Workshop on Hardware Optimisation EvoHOT 2005 (Lausanne, Switzerland)
  - European Modelling and Simulation Conference 2005 (Porto, Portugal)
  - IEEE Design and Diagnostics of Electronic Circuits and Systems Workshop - DECS 2005 (Sopron, Hungary)
• Preparation of new forms of tuition:
  o creation of study support and materials for the Bachelor’s study programme in both Czech and English,
  o improvement of quality of HW-oriented subjects through a hardware kit sponsored by the European Social Fund (ESF)
• Expert opinion on grant projects, conference and journal articles and students work
III.5 Computer Centre

The Computer Centre is a self-contained part of the Faculty of Information Technology. It guarantees the running of computer laboratories, both local and faculty net, servers and information systems. The computer laboratories of the Centre are utilised both for scheduled tuition and for work on projects, diploma theses and research projects. Apart from the scheduled teaching hours the laboratories are open to all students of the FIT.

Staff

Head
Lampa Petr, Ing.

Deputy Head
Čejka Rudolf, Ing.

Centre Manager
Dupalová Helena

Systém Integrator
Gaďorek Petr, Ing.

Information System Administrator
Michal Bohumil, Ing.

Computer Network Administrator
Lampa Petr, Ing.

OS Administrator
Čejka Rudolf, Ing.
Kašpárek Tomáš, Ing.

Technical and Administrative Staff
Kappler Karel
Kreslík František, Ing.

Programmer
Skokanová Jana, Mgr.

Attendants
Cvrčková Pavla
Habrdová Stella
Nečasová Milena
Pagová Ywetta
Samsonová Radomíra

Equipment

All faculty servers are concentrated in the computer node of the Computer Centre. Most servers are placed in 19'' cabinets, at present there are 36 servers installed in 6 cases. Other servers are placed on laboratory desks. The computer network is based on Ethernet gigabit technology with switches at the 3rd level. The central element of the network is a fully redundant modular switch Extreme Networks Black Diamond 6808 equipped with 4 modules with a total of 48 ports 1Gb/s and 2 modules with 96 ports 10/100 Mb/s. All servers and switches in other switchboard centres are connected to the central switch through 1 Gb/s. Important parts of the faculty (corridors, lecture halls, library, and conference rooms) are covered by the WiFi wireless net. The FIT computer network is linked to CESNET2 - the national network for science and research - at a speed of 2x1 Gb/s.
Teaching and Research Laboratories

- Laboratories with personal computers and Windows XP/Linux systems (120 workstations)
- 2 unscheduled Internet laboratories open to all students of the faculty (a total of 42 computers)

Special Instrumentation and Computers

- IBM BladeCenter server with 12 modules each with two Intel Xeon 2,8 GHz processors, 1 GB RAM and 40 GB system disk.
- IBM BladeCenter server with 14 modules each with two Intel Xeon 3,2 GHz, 2 GB RAM and 36 GB disk. The modules are linked to an internal gigabit switch and each of them has a capacity of a server.
- A SuperMicro 6023P server of the faculty information system, 2 Intel Xeon processors, 3 GB RAM, a RAID-1 disk array, 280 GB.
- A SuperMicro 6024H Faculty Web server, 2 Intel Xeon processors, 2 GB RAM, a RAID-5 disk array, 300 GB
- A HP DL385G1 computing server, 2 AMD Opteron 2,8GHz processors, 8GB RAM, 280 GB HDD.
- A Supermicro 7043P research server, 2 Intel Xeon processors, 3,06 GHz and 2 GB oper. memory.
- Three SuperMicro SC933 file servers with RAID-5 disk arrays with a total capacity of 5 TB for speech signal storing and processing.
- Four SuperMicro SC933 video servers, 2 Intel Xeon processors 3,6 GHz, 2 GB RAM, each with a RAID-5 disk array 4,2 TB
- A Students’ server (Web, email, file server), 2 Intel Pentium III processors, 1.5 GB RAM, RAID-5 disk array with a capacity of 600 GB.
- Novell NetWare student and staff server with 2 Intel Xeon processors, 1 GB RAM, and RAID-5 of 800GB and 700GB capacity
- FTP archive with a RAID-5 disk array, 540 GB capacity.
- An Overland NEO 4200 back-up library with LTO3 drive a total back-up capacity of 96 TB

Software

- Operating systems and Microsoft application software in Campus 3 licence.
- Sun Grid Engine for computations in clusters
- A database server and Oracle 9i/10i development tools (within the academic programme of Oracle)
- Microsoft Visual Studio and Microsoft Project development environments within the licence of MSDN Academic Alliance
- Caché post-relational database system (a gift from InterSystems Corporation within the “Caché Campus Program”).
- Object-oriented CASE system Paradigm Plus by Computer Associates.
- OrCAD Caddence Design System
- FPGA and ASIC MentorGraphics ModelSim Design System
• Adobe Photoshop, Acrobat Distiller and Premiere, Autodesk 3D studio, Caligari TrueSpace.
• GNU Open Software, Mozilla, TeX, Linux, FreeBSD, MySQL, Apache, PHP4, etc.

**Tuition**

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**Research Projects**

**Optical network in national research and its new applications - Programmable hardware**, CESNET, MSM6383917201, 2004-2010:

Research leader: Novotný Jiří

Team leaders: Čejka Rudolf, Fučík Otto, Kořenek Jan, Martinek Tomáš, Matoušek Petr, Pečenka Tomáš, Smrčka Aleš, Vojnar Tomáš, Zemčík Pavel


Research leader: Motlíček Petr

Team leaders: Karafiát Martin, Kašpárek Tomáš, Sumec Stanislav

**Membership in International Institutions and Societies**

- Čejka Rudolf, Ing.,
  - Czech and Slovak Simulation Society (CSSS)
- Lampa Petr, Ing.,
  - Usenix
  - Sage

**Publications**

Presentations, el. documents:

Lampa, P.: Experience with building and running an open source-based information system, Špindlerův Mlyn, CZ, 2005, p. 21

Conference articles:


Honzík, J., M., Lampa, P.: Computer aided QA process of accreditation of study program "Information technology" at FIT BUT in the Czech Republic, Corfu, Greece, GR, 2005, pp. 84-89, ISBN 55555555


Products:

System for semiautomatic quality check of speech annotations using web interface, 2005
Authors: Černocký Jan, Chalupniček Kamil, Kašpárek Tomáš