Kajaani University Consortium
ANNUAL REPORT 2008
CONTENTS

Director's Preface 3
General Information about the University Consortium 4
Events 5
Research 7
Teaching 8
Unit Overviews 10
  Department of Teacher Education 10
  Continuing Education 11
  The Laboratory of Biotechnology 12
  Measurement and Sensor Laboratory 13
  Department of Information Processing Science, Kajaani Unit 14
  Education of Sports Technology 14
  Lönnrot Institute 15
  Library 15
  The International Master's Degree Programme in Cultural Entrepreneurship 16
  Research and Innovation Manager 16
Resources 17
  Facilities 17
  Personnel 18
  Finances 20
International Activities 22
Publications 23
Board and Organization 24
Contact Information 26
Editorial Information 27

The “University of Oulu 50 years” slogans and logos.
The major reform of the Finnish higher education system has progressed rapidly during the year 2008. The deadline for statements concerning the draft of the new Universities Act set by the Ministry of Education was November 11th, 2008. The purpose of the Act is to reinforce the autonomous status of universities and turn universities from accounting offices into independent legal persons. The new Universities Act is hoped to reinforce the universities’ relationship with the society at large as well. It gives universities more flexibility in financial matters. In the future, universities can accept donations, collect capital and engage in trade. The Act includes University Consortiums, and this way their importance as actuators of the universities’ societal interaction is reinforced. The new law enables the experimental collecting of tuition fees from students from outside the EU or EEA.

In 2008, many types of foundations have been laid for the further development of Kajaani University Consortium as well. Professor Jorma Rantanen’s disquisition brought forth many fruitful starting points for development. Of these, the consortium agreement to enhance the cooperation between the University of Oulu and Kajaani University of Applied Sciences deserves a special mention. The proposal regarding the structure of the Kajaani unit by Professor Rauli Svento’s team was approved at the meeting of the university board in late 2008. The role of Jyväskylä, the rapidly developing University of Eastern Finland and the University of Lapland has gained prominence and become more concrete thanks to Master’s Degree programmes and post-graduate education. International relations have been improved, especially as regards Russia and China.

Concrete results become evident as the broadened collaboration agreements of the Consortium. The regional innovation activities in Kainuu and Upper Savonia are part of the new strategy. The University Consortium Evaluation was conducted by the Finnish Higher Education Evaluation Council at all university consortiums during the year 2008. The preliminary feedback discussion portrayed the activities of Kajaani University Consortium very favourably.

The year 2008 has shown that the university consortiums will in the future face great challenges as pertains to their function as a societal service provider. The fact that financial structures at the Kajaani University Consortium will continue to lean mainly upon structural funds will be a problem. In 2008, some of the temporary offices could not be renewed due to delayed funding decisions. This signal should be a wake-up call to begin the strategic development of a financial base in order to secure the positions of our expert personnel this year already. The development barometer concerning the Region of Kainuu indicates that there is a need for strategic international collaboration. The weak signals indicating a forthcoming depression became stronger toward the end of the year, and the Kainuu region got its share of the rather harsh measures presently being taken in the financial circles as well.

The past year has been very educational and it has shown clearly that each university consortium must have a solid core, and between those, a joint regional development assessment system that facilitates the completion of the universities’ societal service activities.

As the depression will in all likelihood deepen in the coming years, the developmental challenges that the Kajaani University Consortium will face have to be articulated clearly in the new strategy that is to be formed with our partner universities. In this strategy the regionalistic activities that cater to the surrounding areas are not to be seen as a factor hindering international collaboration.

Juhani Suortti
In terms of activities and finances, Kajaani University Consortium had a challenging year. The financial status of the Region of Kainuu, where the Consortium is located, has deteriorated. On September 10th, 2008, UPM announced that it was going to close the Kajaani Paper Mill. Because of this, Kainuu will in the course of two years lose approximately 8.4% of its financial growth. This comes to 168.8 million Euros. The closing of the factory will degrade the Kainuu region's standard of living by 10.6% by the end of the year 2020. Meanwhile, the global depression has made the situation worse.

Kajaani University Consortium was involved in the creation of a stimulus package for Kainuu, with the help of which the region would immediately get 380 new immediate jobs and 500 new consequential jobs by the year 2010. The proposal presented for the Finnish Government included educational measures, business investments, operational environment projects, technology projects and employment-based investment support.

The Ministry of Education conducted the University Consortium Evaluation, in which Kajaani University Consortium came out well. According to the evaluation team, the strengths of the consortium were the Department of Teacher Education and its research and education activities. In addition to this, the evaluation team considered it a strength that regional businesses were actively involved in the activities of the consortium. The Measurement and Sensor Laboratory and the Laboratory of Biotechnology, as well as the Kajaani Unit of the Department of Information Processing Science collaborated successfully with partners from the business life. There has been a company representative in the supervision group of every project that has been carried out in collaboration with a company. This has ensured that the value innovations thus produced have been easy to commercialize and to be transformed into new jobs.

The evaluation team saw that the administrative system of the consortium ought to be developed further. The team considered it complicated and lacking in the clear distribution of responsibilities and leadership roles. In addition to this, the consortium should become less dependent on structural funds and seek out new financial instruments for research purposes in particular.

The Kajaani University Consortium actively promoted the inclusion of the university consortiums to the Universities Act and the decree on university funding, which is currently in preparation. This work was successful. During the year 2008 it was confirmed that university consortiums are mentioned both in the Act proper and its explanatory sections. On the other hand, the Ministry of Education is channeling money specifically for developing the university consortiums.

On September 11th, 2008, The University of Oulu, Kajaani University of Applied Sciences and the City of Kajaani signed the Kajaani Higher Education Institution Consortium Agreement in order to develop educational collaboration in the region. According to this agreement, the further education activities of the Kajaani University Consortium and Kajaani University of Applied Sciences is to be centralized into one unit, which enables good coordination within the region, the mapping of educational needs and the allocation of resources. In addition to this, there is collaboration with several support services, e.g. student affairs services, international relations and library services. A joint ICT centre is also being planned.

Sotkamo’s science concept has strengthened every year. The University of Jyväskylä is currently establishing its Master’s Degree and Doctoral programmes. The University of Kuopio, together with the Laboratory of Biotechnology at the Kajaani University Consortium are starting a Master’s Degree programme in Food Biotechnology and a new training laboratory. Centre for Wireless Communication (CWC) Kainuu has been established in Snowpolis and it studies wireless measurement technology data communications, i.e. wireless embedded sensor technologies to be used in industrial automation, sports and health care, in collaboration with businesses.
EVENTS

Jan 1, 2008 CreaProc project international seminar, Department of Information Processing Science, Kajaani Unit

Jan 17, 2008 Visit of Natural Products theme group, Sotkamo, Laboratory of Biotechnology


Feb 28, 2008 Kainuu Area Literature Award for Reiho Heikkinen, Kaukametsän sali, Kalevala Day celebration

Mar 12, 2008 Recreational activities day for the staff in Kuhmo

Mar 25, 2008 The preparatory education of immigrant teachers began in Kajaani, Department of Teacher Education/Continuing Education

Apr 4, 2008 Diploma Conferment Ceremony

Apr 9, 2008 The Kainuu Theme Programmes’ Future seminar in Paltamo, Lönnrot Institute

Apr 21-24, 2008 Docent Julianna Rusvai’s (College of Nyiregyháza, Hungary) Erasmus visiting lecturer lecture series on Hungarian Literature, Martti Helan Sali, Department of Teacher Education and the Summer University of Kainuu

Apr 30, 2008 Giving the student cap to the statue of Elias Lönnrot, beginning of the students’ May Day celebration, University Consortium student organizations Opela ry and Blanko ry

May 13, 2008 Floora Day celebration, University of Oulu 50 years, Martti Helan Sali, Kajaani University Consortium, Kajaani UAS and Akava Kainuu

May 16, 2008 The University of Oulu Jubilee Year Staff Medal awarding ceremony, Martti Helan sali

May 21, Visitors from Jiujiang, Kajaani’s twin city in China, on campus

Jun 6-8, 2008 East and Northern Finland Village Head and Kainuu Region Village Action Days, Sotkamo, Kajaani University Consortium

Jun 10, 2008 Teachers who graduated 50 years ago were invited on campus

Jun 11, 2008 Professor Thomas Haertlé (INRA, France), visiting lecturer, Sotkamo, The Laboratory of Biotechnology

Jun 16, 2008 Äpyli became the mascot cow for the Kanaani Department of Teacher Education

Jun 23–25, 2008 The Palma II project, international seminar in Sotkamo, Lönnrot Institute

Jul 21, 2008 Masters of Education who had been working in the field for over 20 years since their graduation got an introductory tour of the Dept. of Teacher Education

Aug 1, Ph.D., docent Raija Pirttimaa appointed as the Professor of Special Education (special pedagogical research on teaching and learning), Department of Teacher Education

Aug 27–28 11th introductory seminar for students studying to be a teacher, in Rehjansaari, Department of Teacher Education

Aug 22, 2008 Lic.Phil. Seija Blomberg’s public defense of her doctoral dissertation As a Novice Teacher at a Comprehensive School – The Authentic Experiences of the Beginning Teacher During Their First Year of Teaching, University of Helsinki, Faculty of Behavioural Sciences

Sep 2, 2008 The start of the term for the new students in the Master’s Programme in Sports Technology, Sotkamo, University of Jyväskylä, Sports Technology

Sep 4–5, 2008 The Finnish Higher Education Evaluation Council’s evaluation visit
Sep 11, 2008 The Kaikkien yhteinen kampus science day of the Kajaani University Consortium

Sep 11, 2008 The signing of the Kajaani Higher Education Consortium agreement

Sep 12, 2008 Start of term ceremony of the Kajaani University Consortium

Sep 19, 2008 Lic. Sc. Ilpo Niskanen’s public defense of his doctoral dissertation Measurement and analysis of optical properties of turbid media, University of Joensuu, Department of Physics

Oct 2, 2008 Inauguration of Professor Pirttimaa

Oct 2, 2008 The Kainuu Theme Projects project seminar, Paltamo, Lönnrot Institute

Oct 7, 2008 Networks of Power in Kainuu Region seminar, Kaukametsän sali, Lönnrot Institute and Academy of Finland

Oct 7–8, 2008 Two Campuses event

Oct 10, 2008 Diploma Conferment Ceremony

Oct 13, 2008 The Future of Education in Kainuu seminar, Martti Helan Sali, OAJ Kainuu, OAJP Kajaani, Kajaani University Consortium

Oct 24, 2008 Visitors working in the field of teaching from Kajaani’s Swedish twin city Östersund, Department of Teacher Education

Oct 28, 2008 Multicultural Sensing on Campus day, Suoma training and Erasmus exchange students

Nov 11–12, 2008 7th Northern Finland Preschool and Elementary Education days, Kaukametsän sali and the University Consortium campus, State Provincial Offices of Oulu and Lapland and the Kajaani University Consortium

Nov 12, 2008 Exhibition public doctoral dissertation defence – defence traditions from the 18th century, Teacher training school auditorium

Nov 12–13, 2008 Abi fair, Oulu, Linnanmaa campus, Kajaani University Consortium and Kajaani UAS

Dec 4, 2008 Good school – supportive points of view into the everyday life of the school lecture series

Dec 5, 2008 University of Oulu Medals of Distinction awarding ceremony for the employees of the Kajaani University Consortium, Martti Helan sali

Dec 5, 2008 Kainuun Korkeakouluyhdistys ry / Kainuu Summer University 40 years celebration, Martti Helan sali

Dec 8, 2008 Signing of the new collaboration contracts with the Jiangxu University of Finance and Economics, Kajaani and Oulu
RESEARCH

The developing of a new mining industry-related identification and definition method of bacteria is a new field in the research sector. Research related to the analysis of bacteria is gaining prominence, and binding studies between a protein (milk protein BLG) and bioactive peptides (blood pressure) and natural substances (e.g. flavonoids) and related identification techniques have been developed for research purposes. The results thus gained can be used for developing new functional foods.

Collaboration networks related to this research have been strengthened both in Finland and abroad. In biosensor research, bio surfaces and sensors are being developed in human physiological and environmental identification work. Using optical and electrochemical sensor types, it has been possible to develop methods for measuring certain sports and health care-related biomolecules.

International networking is essential for the continuation of research. The mapping of functional activities and functional compounds in berries and the biotechnological processing in order to alter the taste of berries are among the main areas of foodstuff research.

Many business-based payment service studies have been carried out in the foodstuffs research and development field. The trends of the projects and activities has been attempted to outlive so that they fit into and support the Snowpolis concept. The unit has actively taken part in regional research and development projects.

Research activities have produced knowledge in the field of optical measurement technology. Many branches of industry, such as forestry and environmental technology, have made use of the results. From the beginning of 2008, the research activities were overshadowed by the delays in the funding decisions and the decision to run down the Kajaani Paper Mill.

Measurement technology research is mainly built on supplementary funding. Several collaborative projects with the Finnish Technology Development Centre were started. Decisions concerning the EU Framework programme are expected in spring 2009. The University Consor-

The measurement technology docent system received two new members. The work to reorganize research was commenced. In the new model research and exploitation thereof have been divided into separate functions. It is likely that the new model will be implemented during spring 2009.

InnoKainuu – the regional effectiveness study of the Kainuu innovation region from the period 1995–2007 and the study concerning the regional effectiveness of the Valkeakoski Campus were commenced. In addition to this, a research project funded by the Municipal Affairs Development Fund and concerning the historical and predictable change of the innovation environments and regional structure of Finland was commenced.

In the three-year Palma II research project, which is funded by the Rural Policy Committee, which in turn works under the Ministry of Agriculture and Forestry, studies the services for adolescents in remote and sparsely populated areas especially in Finland, but also in Norway, Russia and Romania.

The CreaProc project, which ended in March, studied and developed organizational activity processes, analysis methods and tools. The purpose of the CreaBase project is to establish the presence of a joint usability and process research innovation environment of the companies producing IT solutions and their customers to the Kajaani Unit of the Department of Information Processing Science. CreaLearn is a multidisciplinary basic research project in the field of IT, which supports the companies ability to regenerate and the emergence of know-how centres. A special development task of the project is the support of decentralized project work. A preliminary study on the usability of vehicle information system has helped to begin to create a local and international training network in order to begin collaborating in teaching and research.

The focal points of the research in the field of educational science are basic research concerning learning and the development of the applications of teacher training. Psychological studies have concentrated on the principles of the development of skills in different areas, and in pedagogical studies a central research topic has been the motivation to learn, the meaningfulness of learning and the creation thereof. These studies have been conducted in collaboration with research units and researchers from Japan, USA, Canada and Russia by collecting joint research material and co-publishing the results.

SkillLab is an empirical psychology research laboratory (founded in 2004) that offers both theoretical and empirical tools for studying the different sides of human experience and human activities. The focal areas of the research are the study of the reading process, emotional dynamics, skill functions observation strategies and the organizationalizing of motor functions. The study makes use of the latest eye movement measurement technology, the measurement of the electrical activity of muscles and pulse variability analysis.

ANNUAL REPORT 2008
Master's and Bachelor's Degrees in Kajaani

The units giving degree education at the Kajaani University Consortium are part of faculties in their field: the Master's Programme in Sports Technology belongs to the Faculty of Sport and Health Sciences of the University of Jyväskylä, the Department of Teacher Education is a part of the Faculty of Education at the University of Oulu, and the Kajaani Unit of the Department of Information Processing Science is part of the Faculty of Science of the University of Oulu.

Students completing their Primary Teacher, Early Education (kindergarten teacher), PE Teacher, Swedish Language and Swedish Language Immersion Teacher and Mathematics Teacher qualifications were also enrolled at the Kajaani University Consortium in the Master of Education or Master of Arts degree programmes. Moreover, an Arts Teacher Master’s Programme (Virt@) was organized as conversion training in collaboration with the Helsinki University of Art and Design. Department of Continuing Education organized a special class teacher training (40 ECTS credits) as a specific competence training for primary and subject teachers in collaboration with the University of Jyväskylä, as well as a Suoma competence training for immigrants. The Continuing Education unit coordinated the updating training in the field of Education in the region, as well as the Kainuu AITO committee. The activities of the Kainuu Region Higher Education Institution was developed further together with the Kainuu UAS and the Kainuu Summer University.

In Information Processing Science, Kajaani University Consortium provided degree education aiming towards a Master of Science (M.Sc.) degree in the Software Production and Software Business elective programmes. At the Measurement and Sensor Laboratory, some students who had originally enrolled in the DIKO project, which ended in 2007, were still in the process of completing their Master of Science (Engineering) degrees. The professor and assistant of the Department of Electrical and Information Engineering assigned at the laboratory continued their work of supervising the students’ Master’s Theses mainly in the photonics team. The University of Jyväskylä organized conversion training in Sports Technology in Vuokatti. New student selections were completed in summer 2008, out of which 13 students were chosen to begin their studies in autumn 2008. In addition to this, a fifth selection process was completed in December 2008, in which 21 students were selected.

Master’s Programme in Culture Continues – The University of Kuopio Begins a Master’s Programme in Biotechnology in Sotkamo

The Master’s Degree Programme in Cultural Production and Services, Jan 10, 2005-Dec 21, 2007, was continued in autumn 2008 when the University of Lapland assumed the responsibility of organizing university level teaching in the field of culture at the Kajaani University Consortium. The International Master’s Degree Programme in Cultural Entrepreneurship will admit new students in spring 2009. The University of Kuopio will commence a Master’s Degree Programme in Food Biotechnology at the Laboratory of Biotechnology in Sotkamo. As the subjects offered by the different universities increase in number, the possibilities for cross-university studies will become more numerous as well. In cross-university studies the student can include applicable courses or an entire minor subject into his or her degree, choosing from the selection offered by the different units at the Consortium. The students who have made use of this opportunity the most are the students at the Department of Teacher Education and students of Information Processing Science.
Suoma – Competence Training for Immigrant Teachers

At the beginning of September the Consortium began an entirely new competence training programme for teachers with immigrant backgrounds. The training is organized by the Kajaani Department of Teacher Education and Continuing Education.

This is a labour political training and is due to end in May 2009. The scope of the training is 45 ECTS credits, consisting of courses in e.g. pedagogical studies, information and communication technology, educational administration and job market coaching. There is a total of 25 ECTS credits of practical training periods.

The students are immigrants with permanent residence in Finland and who hold teacher qualifications in their country of origin. The decisions of recognition by the Finnish National Board of Education formulate the required additional studies that qualify the immigrant teachers to apply for positions in Finnish schools. All Suoma students are subject teachers. The subjects they teach include Finnish, Karelian, Russian, Hungarian and English languages, Mathematics, PE, Arts, History and Psychology.

Open University

The open university at the Consortium coordinates the operation of the open university in Kainuu and Upper Savonia and provides teaching in accordance with the curriculum of the six faculties of the University of Oulu, including the Kajaani unit of Teacher Training. Courses and study packages from all faculties were included. New additions were language courses in Italian and Japanese, basic studies in Chemistry and Mathematics from Faculty of Science, and from the Faculty of Education, basic studies in Special Education and Shop. The pathway studies in Nursing Science went on. The students of Open University were mainly from the Kainuu area. A total of 64 different courses were taught in 2008. A total of 17 study packages were included; of these, 12 were basic studies packages and 5 subject study packages. There was a total of 1543 teaching hours and the net amount of students was 452.

The persons responsible for the activities of the Open University of the University of Oulu in Kajaani are a full-time amanuensis and a part-time financial manager.

Doctoral Studies at the Kajaani Campus

The need for academic postgraduate studies has been recognized in Kajaani already in the 1990s. At the Department of Teacher Education this has been conducted for many years already. In the development strategy of Kajaani Higher Education Units the regional postgraduate teaching was commenced in the beginning of the year 2002.

These activities have developed into a regional multidisciplinary doctor incubator programme organized by the Continuing Education unit. The purpose of this is to activate and recruit people who are previously employed and interested in academic postgraduate studies in the Kainuu and Upper Savonia regions, and organize different postgraduate study support and supervision services for doctoral students. Coaching, training and supervision is organized for those interested in postgraduate studies, and senior postgraduate students are provided with courses that support and complement their studies.

Mentoring is organized for students in the process of finishing their dissertation to facilitate the completion of their theses. There are approximately a hundred people interested in postgraduate study and 20–30 active postgraduate students.
Teacher Training Became Stronger – The First Professor of Special Education in Northern Finland Was Inaugurated

Professorships in Special Education and Physical Education improve the quality of teaching and research, and will promote the ability of top research to renew itself, as well as international networking at the Consortium and the faculty. In Continuing Education, issues that received special attention included complementary training in teaching and education, questions of equality, the development of the working life and work communities, open university and collaboration with the Consortium partner universities, Kajaani UAS and the Kainuu Summer University.

The Kajaani Department of Teacher Education remained popular among prospective students. The unit received nearly a thousand applications. The subject teaching in Special Education was further improved by re-organizing the teaching and research positions in accordance with the strategy outlined in the decision made by the university board in 2006. The cross-university studying in Information Processing Science, as well as other collaboration with the unit of Information Processing Science was increased.

The Kajaani University Consortium is the only teacher education provider in Finland that has met the information and content requirements set by the Ministry of Education in 2004 regarding the inclusion of entrepreneurship education to the Primary Teacher undergraduate degree programme. The unit is a representative in the entrepreneurship committee of the Ministry of Education, the purpose of which is to develop and coordinate teaching in comprehensive schools, upper secondary schools and vocational schools.

The international activities of the unit increased thanks to long term research and teacher exchange. Collaboration with China, Japan and the USA is considerable.

The activities of the Kajaani Normal School rely heavily upon academic research and development work. As a networking study and training school centre, the normal school collaborates with schools in the field in order to develop the students’ practical work know-how.
Continuing Education

Focal areas in Continuing Education were complementary training in the field of teaching and education, questions of equality in working life and the field of education, the development of the working life and work communities, as well as open university. Teaching is provided in the forms of vocational specialization studies, competence training, grade training, complementary training and special requests for training, Studia Generalia lecture series, theme seminars and public lectures.

The Work and Entrepreneurship in the Arts and Culture Senior Academy project started on June 1st, 2008 and will go on until May 31, 2011. The purpose of the project is the development of know-how in the field of arts and culture, supporting entrepreneurship and meeting the changing needs of the working life. Central activities include providing academic education in the fields of arts and culture. In addition to this, attention is paid to the use of virtual solutions and the development of international collaboration.

The Moninainen Woima project went on until the end of February. The Equality Planning into Practice 2007–2008 project, ordered by the Ministry of Social Affairs and Health, went on until the end of April. The project carried out 47 separate consulting sessions in 2008. The Equality as a Promotor of the Welfare, Employment Situation and Competitiveness of Kainuu Area project began on May 1, 2008.

The most central tasks and projects in the development of working life and work communities were the work community development services 2005–2009 completed for the Kainuu of Good Working Communities workplace development Tykes project by the Joint Authority of Kainuu. Long-term expert training projects in the field were the supervisor training programmes and expert lectures on the development of working organizations and welfare at work ordered by the Joint Authority of Kalajokilaakso for the years 2006–2008 and the Kainuu Vocational School Apprenticeship Training Services for the years 2008–2011.

In 2008, a total of 50 complementary training programmes were organized. Of these, 31 were long-term and 19 were short-term. There were 360 workdays, 2247 participants, 2262 teaching hours and 12 person-years. Like in previous years, focus in the activities of the Continuing Education unit was on long-term training and collaboration with other educational organizations.
The activities of the Laboratory of Biotechnology was focused on three areas: 1. The development of biotechnology knowhow related to foodstuffs and milk, including related research on wild berries and other biomasses (herbs, plants etc.) and commercial development. 2. The improvement of bioanalytics know-how in the research fields, including bio sensor research and development related to human physiology (sports and health care) and the environment (water, the mining industry). 3. The development of educational, technology transfer, innovation and business services, the development of the international aspect of research and innovation activities, and the expanding of collaboration and affiliate networks. The bioresearch activity development programme BIOKEHO ESR and the general development programme of the field of biology, BIOKEHO EAKR are functioning in the three above-mentioned fields.

A Master’s Degree Programme in Food Biotechnology began as a collaborative project with the University of Kuopio. Initially, 20 students were enrolled. The actual teaching starts in February 2009. The goal is to keep this as a regular programme in the future.

The unit wokrs in the national Measurement Technology cluster and an actor and a board member in the Measurepolis programme. The Laboratory of Biotechnology had a project (BiMi2) in the Measurepolis programme that dealt with human physiological biommeasurements and environmental analysis (of water in mines). The development of sensors for mining-related water analyses has begun as well.

There are two projects funded by the Finnish Funding Agency for Technology and Innovation going on at the Laboratory. These study the identification of bioindicators from saliva (MOSA) and the development of a quick method for identifying bacteria (2-b-identification). The Laboratory was also involved in the Finnish Funding Agency for Technology and Innovation-funded Flavour Design project together with VTT Technical Research Centre of Finland, the University of Turku and MTT Agrifood Research Finland.
The national and global financial crisis made an impact on the activities of the Laboratory: for the first time the parameters of both finances and personnel decreased. The decision to close UPM Kajaani affected research activities as well, as a collaborator was lost from nearby, the same city. However, the Laboratory succeeded in stabilizing the activities in a controlled manner, and towards the end of the year the future looked brighter.

The team of docents and professors compiled to support the scientific research continued their work. Docents with full-time employments outside the university have been integrated into the team, both for basic technology research, i.e. optics and the main application, i.e. forest industry. Research teams work with six applications: paper and pulp, mechanical wood, wireless instrumentation, environmental technology and sport technology, as well as a photonics team that mainly applies image processing technology. The team work model was kept intact, which maintained the stability of the activities amidst great changes.

The Laboratory’s work gained recognition when the national assessment board gave its level of research a good grade. The results of the assessment were received at a stage where positive feedback helped in the struggle to secure the preconditions for research and finances.

The funding for the research conducted at the Laboratory was entirely project-based: the teams were responsible for the research in their respective fields, both in terms of project administration and the research per se. The societal effectiveness was channeled through companies; an international aspect was brought to the work at the Laboratory by both international students and researchers visiting the Laboratory and the local staff going to work abroad in different universities and research institutions.

Measurement and Sensor Laboratory
**Department of Information Processing Science, Kajaani Unit**

The Kajaani Unit of the Department of Information Processing Science of the University of Oulu (TOL) offers the comfortable and modern study environment of a small unit combined with the teaching benefits of a large mother department. Modern teaching technology ensures that the know-how of the entire teaching staff is conveyed to all students. The students take either the software production or software business elective programmes. By the end of 2008, a total of 25 Masters of Science have graduated from the unit.

The Kajaani Unit collaborates with local companies in studies and projects alike. The CreaProc project, which ended in March, studied and developed organizational activity processes, analysis methods and tools. International collaboration networks were created as well, and two seminars were organized. The CreaBase and CreaLearn projects were commenced.

The Kajaani Unit of the Department of Information Processing Science completed a preliminary study on the need and realization possibilities of a vehicle information system usability training to be arranged in Kajaani. A preliminary study on the usability of vehicle information system has helped to begin to create a local and international training network in order to begin collaborating in teaching and research. The end result has been a suggestion that the contents and teaching of the vehicle information system usability training arranged in Kajaani possible be divided between the Department of Information Processing Science and Kajaani UAS.

**Education of Sports Technology**

The Sports Technology conversion training programme of the University of Jyväskylä began in Vuokatti in 2008 and was still going on strong in 2008. The students accepted to the training have held a degree or have been in the process of completing a university or a UAS degree from a field of technology and information technology deemed suitable for the purposes of the training. The contents of the education are based on the subjects taught at the Department of Sports Biology at the University of Jyväskylä. As of December 31, 2008, fifteen Masters of Science (Sports and Health Sciences) have graduated from the programme.

Doctoral training has been offered in Vuokatti since 2005 as well. The goal is that first doctors would graduate in 2010. The Doctoral education programme incorporates significant research in the field to Snowpolis in the Vuokatti area and is the framework for quality international research as sports technology is developed in Vuokatti. The research aims towards developing versatile methods and instruments with which it is possible to measure and demonstrate the physiological, neurophysiological and mechanical responses and mechanisms related to human motorical functions.

These actions are consistent with the goals of the programme, which are 1) to produce quality sports technology know-how to the Kainuu Region and the Province of Oulu, 2) to develop business-based sports technological research in Snowpolis and 3) to establish permanent international research activities to the region.
Lönnrot Institute

The final assessment of the Regional Rural Policy Programme 2000–2006 (ALMA) ordered by the Ministry of Agriculture and Forestry was completed. The unit also completed the assessments of the ESR projects funded by the Northern Ostrobothnia Employment and Economic Development Centre and the three development projects of the Northern Ostrobothnia Hospital District, and the assessment of the Innovative Activities X-Branches programme for the Council of Oulu Region. In addition to this, the assessments of the culture and tourism projects State Provincial Office of Oulu and the Tacis projects funded by the Southeastern Finland-Russia Neighbourhood Programme were completed. The continuous assessment of the Mainland Finland rural development programme of 2007–2013 was commenced. The unit began a new research project examining the change of the Finnish regional structure and the development of innovative environments, as well as a research project centered on the Kainuu region innovation environment. The international Palma II project, which looks at services for adolescents in rural areas, was commenced.

The Lönnrot Institute is involved in the coordination of theme programmes developing the rural areas in Kainuu. The Bioenergy theme project, which coordinates the Kainuu bioenergy programme, as well as the Kainuu village theme project, which coordinates the Kainuu region village theme programme and develops the specialization of the villages, were commenced. The tasks of the Bioenergy theme project include increasing collaboration between the actors in the field, publicizing and the working of ideas into financeable projects. The basic principle of the village theme project is the equal, collaborative planning work of the residents, officials and elected officials.

Library

The library organized training in data collection for undergraduates, postgraduate students, open university and continuing education students, as well as researchers, teachers and other staff (a total of 129 lessons for 598 participants). 412 information retrievals were conducted for customers. 18 297 library visits were calculated. There were 14 297 local loans, 81 long-distance loans and a total of 72 joint loans from the National Repository Library and the Kajaani UAS Library were received. 246 long-distance loans were sent out to other libraries. A total of 1004 new titles were acquired (of which 562 were bought), and 86 new items were listed in the Measurement and Sensor Laboratory and the Kajaani Unit of the Department of Information Processing Science libraries. A total of 104 volumes of printed journals were subscribed (and addition to this, 25 annual volumes of free journals were received). 213 annual volumes were removed from the stack.

The facility workforce assigned by the Rector, the purpose of which was to organize the Kajaani University Consortium library and archive facilities finished its report in June. The report proposes that the renovation of the Kajaani University Consortium library be conducted in 2010.

The post of the Information Specialist of the Kajaani Libraries was continued in 2008 at the Kajaani University Consortium and it was agreed that it would continue in 2009 as well. The Information Specialist has divided her working hours between the organizations according to their respective shares of payment. Joint loaning between the university library and the Kajaani UAS library continued.
The Upper Savonia area has developed a demand-based, practice-oriented innovation service model, which is to guide education, research and development activities to targets that are of benefit to livelihood. The collaboration with the help of a Spokesman of Higher Education begun in 2004, the contract-based collaboration of higher education institutions was increased in 2006 by an agreement between the University of Oulu, University of Kuopio, the Savonia UAS and the region. The Enthusiastic and Learning Eastern Finland (INNO-STU) project 2006–2007 took part in the development of a total of fifteen innovations implemented by companies. In order to accomplish this, 162 discovered innovation billets, 89 implementation studies and 31 development projects were needed; 10 higher education institutions took part in these in different ways. One of the results of the project was also the “Upper Savonia Company-based Innovation Strategy 2007–2013” approved by the Regional Centre Program. It focused on every company of the area and their respective innovational activities.

This strategy aims at enhancing the innovational activities, developing innovative structures and environments, as well as developing innovational culture and working methods. The Ylä-Savon Kehitys Oy coordinates the implementation of the strategy. According to the innovation network assessment workshop, the key fields of development, operational principles and questions of delegating are very well known in the Upper Savonia area. Both the strategic premise and collaboration alike could be improved.
RESOURCES

Facilities

The University Consortium campus facilities is managed by Senaatti-kiinteistöt, ISS is in charge of the janitorial services and SOL of the cleaning. The campus has a total of 13 359 m² of facilities in ten buildings. The Measurement and Sensor Laboratory has given up some of its facilities and it now has in use 2192 m² in the Kajaani Technology Centre and 120m² of rented facilities in Snowpolis. The Kajaani Unit of the Department of Information Processing Science has rented 1606 m² from the City of Kajaani. 1038 m² of sports facilities can be used by day in Kajaanihalli. The Laboratory of Biotechnology operates in Valio's old facilities of 637 m² in Sotkamo. The Sports Technology programme of the University of Jyväskylä also operates at Snowpolis. The committee assigned by the rector presents its proposal on the reorganization of the library and archive facilities. A proposal to renovate the library is included in the university’s operational and financial plans.

The utilization rate of the campus teaching facilities was 71,9 %. However, the utilization rate of the TOL teaching facilities was only approximately 16 %. Facility costs were 1,8 million Euros in total. The goal is to use the facilities more effectively as the costs increase and the number of students decreases.

On-campus student and staff catering is the responsibility of Fazer Amica’s restaurant Pedaköökki.
Personnel

The Kajaani University Consortium follows the programmes and guidelines of the Human Resources Management of the University of Oulu. The personnel plans proposed changes in official titles and making temporary positions permanent. The changes in the office structures of the teaching and research staff have been examined by a decision of the University Board. Development discussions were conducted with the staff unit by unit.

The total amount of person-work-years completed at the Consortium was approximately 203, of which 195 man-years were completed at the University of Oulu, 7 at the University of Jyväskylä and one at the University of Lapland. A total of 247 people were employed at the university in positions of varying type and length. A new Professor of Special Education, stationed at Kajaani, was inaugurated. The selection of a Professor of Sports Education was postponed. The plan to change the office of the Research Manager of the Laboratory of Biotechnology into a professorship is still on the table. There were a total of 10 professorships at the University Consortium.
The percentage of temporary positions (63%) at the University Consortium (University of Oulu) is still too large, and the wages depend on supplementary funding (45%). 51% of the personnel had completed a Master’s Degree or equivalent and 15% had completed a Doctoral degree. Because of the delays in the funding decisions of the EU programmes, staff employment contracts have been lamentably short. Uncertainties regarding the continuation of the projects involved in project funding were concretized. The planning of a Kajaani service point was commenced. There have been attempts to anticipate the changes brought on by the commencement of the Productivity Programme and the service center with the help of e.g. training and introductory supervision. In addition to this, three man-years have been allocated to the staff’s welfare at work. There have been staff recreational days with outdoor activities once a term, and different parties and other occasions have been organized for staff and students alike. The university has subsidized workplace sports activities more than the previous years. The compilation of a work well-being and crisis plan for the University Consortium was commenced.
The overall funding of the Kajaani University Consortium decreased from 17.2 million Euros to 15.5 million Euros, i.e. there was a decrease of 1.7 million Euros compared with the previous year. The overall percentage of supplementary funding was 43 %, when taking into account the separate funding from the Ministry of Education, and the percentage of budget funding was approximately 57 % including the appropriations transferred from previous years. Besides the University of Oulu, these figures include the Kainuu-based activities of the collaborating Universities of Jyväskylä and Lapland. The year before, supplementary funding accounted for approximately half of the funding.

The changing of the structural fund period and the delays in the funding decisions concerning the next period was especially trying for the University of Oulu units, whose supplementary funding decreased by almost 2 million Euros. This deficit was compensated partly with the appropriations transferred from previous years’ budgets and partly by cutting back on the activities. It was only possible to launch new structural funds projects towards the end of the year 2008. Internal funding came to a total of 5.7 million Euros. Accrued credits and deferred charges came to 1.3 million Euros.

The University of Oulu units (incl. the normal school) had a total of 7.3 million Euros of annual basic budget funding at their disposal, which comprises only 5 % of the budget funding of the operational costs of the University of Oulu and the teacher training schools. In addition to this, the Ministry of Education allocated half a million Euros for the development of the University Consortium. The units of the University of Jyväskylä and the University of Lapland did not receive any budget funding for their operation.

The expenditure of the University Consortium came to a total of 14.5 million Euros. The expenditure of the University of Oulu units came to 13.9 million Euros, which was approximately 1.5 million Euros less than the previous year. As a new actor at the Consortium the University of Lapland received funding for the Cultural Entrepreneurship Master’s Programme from the State Provincial Office. The expenses of the programme came to approximately one hundred thousand Euros, and the expenses of the University of Jyväskylä Sports Technology programme were approximately half a million Euros.

61 % of the expenses of the University of Oulu units have been covered with budget funding and appropriations received by separate decisions, 16 % of the expenses comes from jointly funded activities, 7 % from paid services and 16 % to funding between accounting offices. A year earlier this totaled 29 %. These are clear indicators of the break in the structural fund funding. The expense structure shows an increase in personnel costs, which comprised 70

| Kajaani University Consortium funding and expenses from 2004 through 2008 (1 000 €) |
|---------------------------------|-------|-------|-------|-------|
| Allocations (incl. special allocations and transferred) | 7 948 | 8 742 | 9 037 | 9 489 |
| Supplementary funding (income) | 8 484 | 8 270 | 7 452 | 7 687 |
| Expenses | 15 444 | 15 525 | 15 448 | 15 767 |
Most of the supplementary funding came from other state offices, which distribute e.g. structural funding from Employment and Economic Development Centres, the State Provincial Office and the Finnish Funding Agency for Technology and Innovation. The Teacher Training Unit received funding from the Academy of Finland. The City of Kajaani funded the Measurement and Sensor Laboratory and the Department of Information Processing Science as agreed in the contract (2007–2012), and the Municipality of Sotkamo funded the Laboratory of Biotechnology. These contracts will be revised in 2009.

When examining the funding unit by unit, the units relying mostly on supplementary funding in relation to their overall budget were Measurement and Sensor Laboratory (incl. Dept. of Electrical Engineering) with 84.7% (95.2% the previous year), the Laboratory of Biotechnology with 82.7% (90.0%), Continuing Education with 78% (80.9%) and the Lönrot Institute with 74% (83.2%). CWC’s operations in Vuokatti were funded entirely by supplementary funding, as was the Sports Technology education. Units relying on budget funding include the teacher training school 99.4% (99.3%), the library, 97.9% (96.7%), Teacher Education Unit 93.5% (86.9%) and Information Processing Science 71.7% (41.9%). In Euros, the Teacher Education Unit had the largest overall funding, a little less than 3.7 million Euros, and the Measurement and Sensor Laboratory (incl. the donation professorship of the Department of Electrical Engineering) had the second-largest overall funding of 3.3 million Euros, and the third-largest was the teacher training school with 2.3 million Euros.

The University Consortium was given 500,000 Euros of development funding (subs. 29.50.20.7) and a total of 514,615 Euros was used, when taking into consideration funds transferred from previous years’ budgets. The Measurement and Sensor Laboratory (incl. Department of Electrical Engineering) used the largest amount of the university consortium funding, almost 290,000 Euros. The Laboratory of Biotechnology and the Kajaani Unit of the Department of Information Processing Science used more than 60,000 Euros.
INTERNATIONAL ACTIVITIES

Staff and student exchange contracts were made with the Zheijiang University of Finance and Economics in China and the Moscow Psychological-Social Institute in Russia.

The Department of Teacher Education has a long history of collaboration with the Nordplus Network ICE (Internordic Cooperation within Education), which includes ten teacher education units in all the Nordic countries, including Greenland and the Faroe Islands. In 1990, Kajaani was involved in establishing this network that is still functioning very efficiently. The network entails student and teacher exchange and an annual intensive course on a changing topic. In recent years, 2–4 teachers from Kajaani have participated in the exchange every year. The responsible teacher and a few interested students have participated in the intensive courses each year. Network heads from each unit convene each year to develop and assess the cooperation.

The University Consortium has a representative in both the European Commission assessment network, which evaluates rural development programmes (The European Expert Committee on Evaluation of Rural Development programmes, 2007–2013) and the rural development assessment set by the European Commission (The European Evaluation Network for Rural Development). The University Consortium is also involved in the UArctic Thematic Network, which includes Russian and Norwegian collaborators. The unit also has collaborators in e.g. the Petrozavodsk State University, the Petrozavodsk branch of the Russian Academy of Science, and the Karelian State Local History Museum.

The DESERVE – Delivering Services in Remote and Rural Areas project (2004–2007) coordinated by the University Consortium was mentioned as a good example of a successful rural area research and development project in a publication by the European Commission and the OECD report on Finnish rural areas (2008). The University Consortium was invited as an expert member to the Finnish delegation to the EU summit on agriculture and rural policy in Cyprus in autumn 2008, the Center for Ethics & Poverty Research conference in Salzburg in the regional studies and job market task-force and in Bern, Switzerland (ICICI).

In biosensor research, the collaborators include the Cranfield University in Great Britain, Università Tor Vergata and Università degli Studi di Firenze in Italy and the Danish Technology Institute in Denmark. Through the biosensor research the University Consortium is involved in the MNT-ERA-Net activities coordinated by the Nordic Innovation Center (NICE). In protein research, there is collaboration with the University of Lund in Sweden and the University of Life Sciences Aas in Norway.

In measurement technology, there were a total of 23 person work-months of research exchange. There was one project researcher from the Moscow State University in the sports measurement team and two researchers from the Petrozavodsk State University in the photonics team. Measurement and Sensor Laboratory researchers visited Japanese and American research facilities. Their research interests included the possibilities of digital holographic microscopy in biomedicine and the exact definition of optical parameters.
PUBLICATIONS

The number of Finnish scientific publications increased in 2008

The research and teaching staff of the University Consortium produced scientific publications in Finnish even more eagerly than before. In 2008 there were a total of 201 publications, of which 61 were published abroad or in international scientific journals, and 16 in other international publications.

There were 33 Finnish scientific publications and 91 other domestic publications. The number of publications per year has remained approximately two hundred. In 2004 the total number of publications was 110, 140 in 2004, 170 in 2006, 209 in 2007 and 201 in 2008. The number of international publications has increased from the year the Consortium first opened with over 60 publications and the number of Finnish publications has increased by almost fifty publications.

The 10th volume of the Kajaani Campus Magazine totaled eleven issues in 2008. The magazine archive can be found at the URL http://www.kajaaninyliopistokeskus.oulu.fi/kampuslehti.
The Board of the Kajaani University Consortium, 2007–2009

Chair:
Director of the Kajaani University Consortium, Professor Juhani Suortti

Permanent Members:
Professor Hannu Soini, University of Oulu, Faculty of Education
Professor Jouni Similä, UO, Faculty of Science, Dept. of Mathematics
Professor Timo Mäkikallio, UO, Faculty of Medicine
Professor Risto Myllylä, UO, Faculty of Technology, Dept.Electronics and Information Processing
Development Expert Soili Makkonen, University of Joensuu
Vice-rector Timo Tiihonen, University of Jyväskylä
Professor, Vice Dean Atte von Wright, University of Kuopio, Faculty of Science and Environment
Vice-rector Jukka Mäkelä, University of Lapland
Lecturer Anneli Pönkkö, Kajaani University Consortium, personnel
Student Emilia Helle, Department of Teacher Education in Kajaani, Opela ry
Director of Upper Secondary and Vocational Education Anssi Tuominen, Joint Authority of Kainuu
Director of Education Risto Brunou, City of Kajaani
Result Area Manager Mervi Widgren, Savonia Polytechnic, Iisalmi Unit
Director Martti Artama, Metso Automation Oy
Executive Director Mauri Kemppainen, Ebsolut Oy

Personal Deputies:
Administrative Director Mikko Isohanni
Professor Keijo Väänänen
Professor Timo Jämsä
Professor Olli Silven
Research Service Director Jari Ratilainen
Senior Officer Toivo Takala
Docent, Senior Researcher Anja Lapveteläinen
Administrative Director Juhani Lillberg
Planner Tuula Honkanen
Student Sohvi Sundqvist
Entrepreneurship Trainer Olli Leppänen
Headmaster Arto Karjalainen
Mayor Martti Harju
Product Development Manager Arvo Rahikkala
Entrepreneur Tuula Uitto-Korhonen
**Organization**

**Management Team and Presenting Officials**

**Management group:**
- Juhani Suortti
- Jouko Käsmä
- Ari Heiskanen
- Tuula Honkanen
- Juha Kalliokoski
- Vesa Linnamo
- Jouni Ponnikas
- Vesa Virtanen

**task:**
- Professor, Director, chair person of the Board of Directors, KYK (Kajaani University Consortium)
- Development Manager (dept.), KYK
- Professor, Department Head, TOL (Dept. of Information Processing Science)
- Planner, Department Head, AIKO (Continuing Education)
- Research Director, Department Head, MILA (Measurements and Sensor Laboratory)
- Professor, Department Head, LT (Sport Technology)
- Senior Researcher, Department Head, LI
- Research Director, Department Head, BIO (Laboratory of Biotechnology)

**Presenting Officials:**
- Anja Hongisto
- Risto Hyvönen
- Jouko Käsmä
- Timo Mauno
- Vuokko Tolonen-Junttila
- Juha Vartiainen

**task:**
- Assistant, personnel matters
- Development Manager, information administration
- Development Manager (dept.), planning, development, co-ordination
- Planner, degree administration and study matters
- Financing Planner, economy
- lecturer, international matters and communications
Kajaani University Consortium
Administrative Services
Seminarinkatu 2
P.O. Box 51, FIN-87101 Kajaani
(Street Address: Satamakatu 3)
Tel. +358 8 632 4611 (exchange)
Fax +358 8 632 4631
E-mail: firstname.lastname@oulu.fi
www.kajaaninyliopistokeskus.oulu.fi

Activities on Campus:
Kajaani Department of Teacher Education
www.kajaaninyliopistokeskus.oulu.fi/koky
Class Teacher Education
Early Childhood Education
Qualifying Education for Master’s Degree for students who hold the Degree of Nursery School Teacher or a Bachelor’s Degree in Education containing the competency for Nursery School Teacher
Pilot Education for Subject Teachers in Mathematics
Pilot Education focusing on Swedish Language Immersion Teaching
Master’s Degree Virt@II on Visual Arts as distance and multiform learning
Kajaani Teacher Training School
IS-Center
SkillLab

Continuing Education
Fax +358 8 632 4820
www.kajaaninyliopistokeskus.oulu.fi/aikuiskoulutus
www.kajaaninyliopistokeskus.oulu.fi/koulutus/avoine
Qualifying education of Special Needs Class Teacher for Class Teachers (40 ECTS credits) (University of Jyväskylä)
Suoma – Competence Training for Immigrant Teachers

Lönnrot Institute
Fax +358 8 632 4820
www.kajaaninyliopistokeskus.oulu.fi/lonnrot

Library
Fax +358 8 627 139
www.kajaaninyliopistokeskus.oulu.fi/kirjasto

International Master’s Degree Programme in Cultural Entrepreneurship (University of Lapland)
University of Lapland / Kajaani University Consortium
Seminarinkatu 2
FIN-87100 Kajaani
Tel. +358 40 849 4569

Activities Situated Elsewhere:
The Laboratory of Biotechnology
Salmelantie 43
FIN-88600 Sotkamo
Tel. +358 8 6332 1312, fax +358 8 6332 1313
www.kajaaninyliopistokeskus.oulu.fi/bio
Master’s Degree Programme in Food Biotechnology (conversion training) (University of Kuopio)

CWC
Snowpolis
Kidekuja 2
FIN-88610 Vuokatti
Tel. +358 8 6178 682, fax +358 8 6178 681

Research and Innovation Manager
Haukisaarentie 2, FIN-74101 Iisalmi
Tel. +358 44 785 6812, fax +358 17 255 6644
www.savonia-amk.fi/iitu/tk/kkam

Sport Technology Education Vuotech (University of Jyväskylä)
Snowpolis
Kidekuja 2
FIN-88610 Vuokatti
Tel. +358 8 617 8642, fax +358 8 617 8641
www.jyu.fi/sport/laitokset/liikuntabiologia/study/study6/vuotech

Conversion Training in Sports Technology
Sports Technology Research Group (University of Oulu / Measurement and Sensor Laboratory)
Snowpolis, Kidekuja 2, FIN-88610 Vuokatti
Tel. +358 44 514 0116

Measurement and Sensor Laboratory
Teknologiapuisto 127
FIN-87400 Kajaani
(Street Address: Kehräämőntie 7)
Tel. +358 8 614 9610, fax +358 8 614 9615
www.mila.oulu.fi

Department of Information Processing Science, Kajaani Unit
(Street Address: Linnankatu 6)
P.O. Box 51, FIN-87101 Kajaani
Tel. +358 8 632 4611 (exchange), fax +358 8 632 4881
www.tol.oulu.fi/kajaani
Software Production Elective Programme
Software Business Elective Programme
EDITORIAL INFORMATION

Editorial Board
Juhani Suortti
Ari Heiskanen
Anja Hongisto
Tuula Honkanen
Juha Kalliokoski
Jouko Käsmä
Vesa Linnamo
Jouni Ponnikas
Outi Vaattovaara
Vesa Virtanen

Editors
Juha Vartiainen
Marjo Hotta
Tuula Nygård
Vuokko Tolonen-Junttila
University Consortium communications team

Graphic Design
Lauri Sonny

Photographs
Picture Archives of the Kajaani University Consortium
Sirpa Filppula
Tero Kesti
Antti Kärkkäinen
Heikki Rytölä
Lauri Sonny
Jouni Taponen
Vuokko Tolonen-Junttila
Juha Vartiainen

Printing House
Kalevaprint Oy
Oulu 2009

ISSN 1797-4822