NordForsk - Application for Nordic Researcher Networks 2008

norden NordForsk

Beslutning: Mottagit: Ref.nr.:

1 Last name	First name	Sex	Title/position
Jämsä-Jounela	Sirkka-Liisa	Female	Professor

University	Academic degree
Helsinki University of Technology (TKK)	PhD

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2 Title of the project/activity (max 50 characters)

Nordic Process Control Network

3 Time span for the first year of the network (dd.mm.yyyy):	4 Subject area (See last page)
From: 01.09.2008 To: 31.08.2011	Technology

5 Estimated number of participants	DK	FI	IS	NO	SE	EE	LT	LV	Other inside the EU*	Other outside the EU*		Total	Men	Women
Research students	8	4		19	2							33	30	3
Other participants	4	12		8	6							30	28	2
Research Groups	2	3		3	2							10		

* Other countries (specify)

6 Summary. Give a short description of the network's targets and aims (max 200 words). NordForsk reserves the right to use parts of the text or the text in full for information purposes.

The importance of automation in the process industries has increased dramatically in recent years. The traditional barriers between information, communication and automation technology are, in the operational context, gradually disappearing. In this context, Northern Europe has played and plays a very important role in improving the degree of automation technology in process industries and Nordic countries have a recognized strong international status in process control and automation.

The main goal for the establishment of the Nordic Process Control Network will be promoting a more concrete collaboration between research groups in four Nordic countries (Denmark, Finland, Norway and Sweden) representing different but complementary aspects of process control research, supporting graduate and post-graduate research training in this field and bridging between the academic and the industrial world filling the gap between theory and application.

This target shall be achieved by supporting researcher education, including PhD students, licentiate students and postdoctoral researchers. The major activities for the network will be:

- To organize a series of intensive training courses (summer schools) around various topics in process control research for young researchers.
- To increase the research student and post-doctoral mobility.
- To organize an annual workshop that will bring together the Nordic process control community.
- To represent a fundamental and essential bridge between the academic and the industrial world filling the gap between theory and application.
- To prepare a forum for the development of common projects at national, Nordic and EU level together with the industrial partners of the network.

7 Total amount requested from NordForsk

900 000,00 NOK

The department has accepted to administer the grant according to NordForsk's rules and conditions	☒
The information about the persons and groups participating in the application is correct. NordForsk may request confirmation (Letters of Intent) from the group leaders or network members.	☒

8 Co-ordinating group (title, name, university, e-mail). A short presentation of the participants in the co-ordinating should be done under point 15.

Title	Name	University or equivalent	E-mail
Prof	Sten Bay Jørgensen	DTU - Denmark	sbj@kt.dtu.dk
Prof	Kurt-Erik Häggblom	Åbo Akademi - Finland	Kurt-Erik.Haggblom@abo.fi
Dr	Kaj Juslin	VTT - Finland	kaj.juslin@vtt.fi
Prof	Bjarne Foss	NTNU - Norway	Bjarne.Foss@itk.ntnu.no
Prof	Sigurd Skogestad	NTNU - Norway	skoge@ntnu.no
Prof	Bernt Lie	Telemark University College - Norway	Bernt.Lie@hit.no
Prof	Claes Breitholtz	CTH - Sweden	claesbr@chalmers.se
Prof	Elling W. Jacobsen	KTH - Sweden	jacobsen@s3.kth.se
Prof	John Bagterp Jørgensen	DTU - Denmark	jbj@imm.dtu.dk

9 Other sources of funding

Source	Amount applied for (NOK)	Received (NOK)	Reply pending (date)

10 Budget

EXPENSES	**Year 1 Budget (NOK)**	**Result (NOK)**	**Year 2 Budget (NOK)**	**Result (NOK)**	**Year 3 Budget (NOK)**	**Result (NOK)**
a) refundable from NordForsk						
Travel expenses	69 703,00		69 703,00		69 703,00	
Living exp.(room/board)	145 941,00		145 941,00		145 941,00	
Honoraria	54 456,00		54 456,00		54 456,00	
Administration	29 900,00		29 900,00		29 900,00	
Material						
Other						
b) not refundable						
Overhead						
Other						
TOTAL EXPENSES	300 000,00		300 000,00		300 000,00	
INCOME						
Requested from NordForsk	300 000,00		300 000,00		300 000,00	
Surplus from previous year						
Other income						
Own resources (incl 30% of *the Baltic part* of the concrete project activity costs)						
TOTAL INCOME						
BALANCE	0,00		0,00		0,00	
		Surplus may be transferred		Surplus may be transferred		

11	A description of the proposed activity, including the following compulsory items (maximum five pages):
a	the current status of research and research training within the subject area in the Nordic countries
b	an exposition of the prospects and need for Nordic co-operation within the subject area with particular reference to research training
c	a detailed plan covering collaborative activities during the three years
d	targets to be achieved during the operating period of the network
e	Visions for continued co-operation after the grant period
f	What consideration are made to increase equal participation and equality of women and men?
g	the estimated number of research students from each country expected to participate in the network

BACKGROUND PROBLEM and CURRENT STATUS

The importance of automation in the process industries has increased dramatically in recent years. In the highly industrialized countries, process automation serves to enhance product quality, master the whole range of products, improve process safety and plant availability, and efficiently utilize resources and lower emissions. In the rapidly developing countries, mass production is the main motivation for applying process automation. The greatest demand for process automation is in the chemical industry, power generating industry, and petrochemical industry; the fastest growing demand for hardware, standard software and services of process automation is in the pharmaceutical industry. The importance of automation technology continues to increase in the process industries. The traditional barriers between information, communication and automation technology are, in the operational context, gradually disappearing. The latest technologies, including wireless networks, fieldbus systems and asset management systems, boost the efficiency of process systems. New application fields like biotechnology and microtechnology pose challenges for future theoretical work in the modeling, analysis and design of control systems.

Northern Europe plays a very important role in improving the importance of automation technology in process industries and Nordic countries have a recognized strong international status in process control and automation. Mainly for this reason in 1994, the Nordic Process Control (NPC) working group was initiated (http://www.nt.ntnu.no/users/skoge/npc.html). Since then the Working Group has been an independent group of individuals who work together to strengthen the ties between the process control communities in the Nordic Countries and to advance the field of process control within these countries. The NPC group is running under the Board composed by academic and industrial representatives. Presently, the following members are partecipating:
- Prof. Sirkka-Liisa Jamsa-Jounela, TKK (Finland)
- Dr. Elling W. Jacobsen, KTH (Sweden)
- Prof. Sten Bay Jørgensen, DTH (Denmark)
- Prof. Sigurd Skogestad, NTNU (Norway)
- Dr. Kaj Juslin, VTT (Finland)
- Dr. Jan Peter Axelsson, Pfizer (Sweden)
- Dr. Jørgen Knudsen, FLS-Automation (Denmark)
- Prof. Claes Breitholtz, CTH (Sweden)
- Prof. Kurt Erik Häggblom, Åbo Akademi (Finland)
- Prof. Bjarne Foss, NTNU (Norway)
- Dr. Jan Richard Sagli, Statoil (Norway)
- Dr. Annika Leonard, Ångpanneforeningen (Sweden)
- Dr. Alf Isaksson, ABB (Sweden)
- Prof. Bernt Lie, Telemark Univ. College(Norway)
- Dr. Hans Aalto, Neste (Finland)
- Dr. Bjørn Glemmestad, Borealis (Norway)

A supportive atmosphere has characterized the group during these years, giving rise to a dynamic, self-evaluating and self-critical unit. The NPC Working Group is made of people committed to the goal of developing research and applications on process control through Nordic collaboration. It consists of at most 16 members, academic and industrial, from each of the countries Denmark, Finland, Norway and Sweden. The Working Group initiates activities including:
1. "Nordic Process Control Workshop. The Working Group proposes the location, date and organizers of an annual or semi-annual meeting. The objective of the workshop is to bring together the Nordic process control community, and to focus the interests of Nordic industry and academia on mutual research goals. The use of the term "workshop" signals that the meeting is informal in style with ample time for discussions, and it is not expected, for example, that written papers are submitted. Instead, a collection of recent publications from the Nordic countries is distributed as literature (notes) for the workshop (see, for instance, http://www.nt.ntnu.no/users/skoge/prost/proceedings/npc07/).
2. Workshop Tutorial. It is customary for the arranging laboratory to give a short tutorial on some topic of general interest in process control. The tutorial is particularly intended for PhD students and other people wishing to gain more knowledge on the subject in question. For instance, among the others, "Fault Diagnosis and Fault Tolerant Control in Dynamic Systems", "Grey Box Stochastic Process Modelling Framework",

and "Optimization based control including model based control (MPC)" are some of the subjects covered during the tutorials in the past years.
3. "Nordic Process Control Award". The Working Group or a subcommittee appointed by the Working Group awards persons who have made a lasting and significant contribution to the field of process control. The award is presented at the NPC Workshop and the receiver is expected to give a lecture.
As a further opportunity of study and deepening, the NPC working group organizes common advanced courses on the subject of process control. The courses are given by internationally recognized professors as for example Professor Francis Joseph Doyle III, from the University of California, which lately gave a week intensive course (http://kepo.hut.fi/Kem-90.V/Biologysystem/) at the Helsinki University of Technology in the Laboratory of Process Control and Automation. The aim of the course has been enlightenment on engineering approaches (and methods) to systems biology as well as to bring together doctoral students and postdoctoral researchers from the different Nordic countries belonging to the NPC Group.

PROSPECTS and NEEDS for NORDIC CO-OPERATION

The current status is an exceptional starting point for the institution of the Nordic Process Control Network (NPCNet), in fact with the establishment of such a network between Nordic countries, the existing NPC working group will be further promoted by more efficient collaboration between research groups representing different but complementary aspects of process control research and by supporting graduate and post-graduate research training in this field. Industrial involvement is essential for innovation in process automation to reach full maturation and availability to the final customers.
This will be the mission of Nordic Process Control Network, a collaborative network that will bring together ten research groups from four Nordic countries, corresponding to the major academic representatives in the process control and automation domain in northern Europe, and outstanding collaborators from industry.

The enhanced cooperation between the Nordic countries shall contribute to providing a sound basis for maintaining and developing highly professional and cost-efficient local competence centers in each of the participating Nordic countries, capable of offering Nordic users a professional and customized interface to process control. The general aim shall be to stimulate Nordic academic to further innovation and economic growth. Another objective for the participating in the network shall be to contribute positively to the development in the field of process control theory and applications, while at the same time supporting an efficient, and resourceful knowledge of high quality for European academic world within the framework of the Nordic Universities.

The Nordic Process Control working group hosts several outstanding scientists and research groups, but since these "hot spots of research" are scattered in many countries, the international visibility of this research is not always as high as it deserves. Therefore, it is of crucial importance to bring excellent Nordic researchers and research groups together to form more visible (virtual, not physical) centre or "networks". Being the intent of network also to encourage industry-academic collaboration, supporting the exchange of scientists and knowledge between industry and academia, the Nordic region will be made more attractive to top researchers and post docs from countries outside the region as well.

TARGETS

The main purpose of the Nordic Process Control Network will be promoting a more concrete collaboration between research groups representing different but complementary aspects of process control research, supporting graduate and post-graduate research training in this field and bridging between the academic and the industrial world filling the gap between theory and application. In the NPC Group, excellent industrial partners are involved, which contribute to the group as active participants and speakers, providing a great contribution from the industries. The experience achieved with the NPC working group has shown that no yet a perfect benefit from industry is achieved, in fact an enhanced co-operation and exchange between researchers from academy and industry (and vice versa) will bring more possibility to strength this relation.

This target shall be further achieved by supporting researcher education, including PhD students, licentiate students and postdoctoral researchers, and improving career possibilities for researchers in the field of process control and automation in the academic as well as in the industrial world. To reach the objectives and taking as a starting point the well-established NPC working group experience, the major activities for the network will be:
- To organize a series of intensive training courses (summer schools) around various topics in process control research for young researchers.
- To increasing the research student and post-doctoral mobility among the participating departments by providing opportunities for extended visits (3-4 weeks) and short visits (4-5 days) to learn specialized skills and to work on common research projects.
Especially, student mobility at the PhD level is strategic in order to promote and build Nordic research. The vision of the project is to provide opportunities for the PhD students within the partners to get into contact with other teams in order to prepare PhD student exchanges or post-doctorate stay abroad.

- To organize an annual workshop that will bring together the Nordic process control community, and will focus on the interests of Nordic industry and academia on mutual research goals. During the workshops, ad hoc thematic brainstorming sessions will be arranges and a committee of young PhD students and post docs will be responsible for preparing the program, arrange working groups and steer the sessions in conclusive comments that will be summarized in a newsletter.
- To prepare a forum for planning common research projects at national, Nordic and European level, aiming to the establishment of a new centre of excellence in Process Control for the Nordic countries.
- To represent a fundamental and essential bridge between the academic and the industrial world filling the gap between theory and application, providing industrial solutions, directly available to the network industrial partners and improving career possibilities for researchers.
- To disseminate results. The network will oversee the maintenance of the web site for the NPCnet including:
    * General description of the network and history of the NPC Group.
    * Explanation of the network structure, with description of the research groups and industrial partners.
    * Definition of the targets.
    * Publications database.
    * Workshop web hosting.
    * Challenges web support.
    * Dataset and software repository.
    * Archival of meetings and mailing lists.

Apart from the research topics, other topics like research methods, writing skills and ethic aspects of scientific research could be part of special sessions for the training courses. These training courses will enhance communication and collaboration between young researchers, and between young researchers and senior researchers.

THREE-YEAR PLAN

The goal of Nordic Process Control Network will be promoting a more efficient collaboration between the Nordic research groups, this target will be achieved increasing mobility among the participating departments, establishing strong connection among the industrial partners in the Nordic Process Control Network, creating a web discussion forum and by means of the following scheduled events listed below:

Activity	2009	2010	2011
NPC Summer School	Norway	Sweden	Denmark
NPC Workshop	Norway	Sweden	Denmark
NPC Newsletters			

The NPCNet workshop will be an annual event dedicated to present the concrete results of our proposed network. In this occasion the progress in the process control field, the results of the advanced courses and research visits, as well as the most recent research results, will be discussed. The Nordic workshop will be a normal research-oriented forum. Students as well as academics and industrial partners can present their completed or under-completion results. A selection of the works to be presented is ensured by the peer review of the submissions. The program committee of the workshop will be formed from the academics as well as industrial representatives of the network participant groups. The program committee will decide later if subsequent publication of the best workshop presentations is sought.

The NPCnet group leaders will have the opportunity to participate to yearly meetings where the activities of the network will be discussed. The meetings provide an excellent framework for organizing the work, reporting the achieved results and highlighting the encountered difficulties. The annual meetings will be supplemented by in-depth boards of discussion regarding the development of co-project and new research issues among the partners from the industry and academia.

The NPCNet summer schools on specific subjects will be a much broader-scope event. Besides fulfilling the educational needs of the research students, the summer school would act as an experiment on the topics to be included in the process control and automation field. The summer school and the workshops will have special doctoral consortium sessions. These ensure the contribution of the students to the integration process as well as give the participants another opportunity to understand each other's research.

During the three years, the network will be also responsible for:
- Set up and maintenance of the www-site for the network;
- e - and video meetings among the network participants;
- PhD courses through internet.

VISION for the CONTINUED CO-OPERATION

The well recognized experience acquired with NPC working group, the establishment of a more concrete cooperation among the northern Europe countries in the NPC Network will be enhanced with the further institution of a Nordic Centre of Excellence in the field of

process system engineering. This will give the possibility to increase the quality, efficiency, competitiveness and visibility of Nordic research through enhanced collaboration between Nordic countries.

PARTECIPATION and EQUALITY of WOMEN and MEN

Being all aware of the fact that in process engineering and also in the area addressed by Nordic Process Control network, most of the researchers are male, it is highly desirable to promote gender equality within this research area. NPCNet will contribute to this promotion by implementing the following measures:
- Women will be stimulated to start a scientific career at the universities involved in NPCnet. The universities will actively encourage female graduates to start a PhD study within the scope of NPCNet.
- Women will be represented in all hierarchical levels of NPCNet. For example, the consortium management team will include both men and women.
- NPCNet will stimulate its female scientists to participate in International and European networks of female scientists.
- Within NPCNet it is the responsibility of the consortium management team to oversee these actions and evaluate their effectiveness in the promotion of gender equality.

In addition to these project-specific measures, the universities involved in NPCNet are actively participating in national and European initiatives to promote and implement equal opportunities policies for women scientists. The universities also have regular campaigns to actively encourage young women to start a university study in science and technology.

ESTIMATED NUMBER OF PARTICIPANTS

The following participants are expected from each research group:

DENMARK:
- Technical University of Denmark (DTU)
  - Department of Chemical and Biochemical Engineering: 6
  - Department of Informatics and Mathematical Modelling: 6

FINLAND:
- Helsinki University of Technology (TKK): 8
- Åbo Akademi University: 5
- VTT: 3

NORWAY:
- Norwegian University of Science and Technology (NTNU)
  - Process Control Group: 11
  - Department of Engineering Cybernetics: 9
- Telemark University College: 7

SWEDEN:
- Chalmers University of Technology (CTH): 4
- Royal Institute of Technology (KTH): 4

Being important part of the NPCnet, also industrial partners have to be considered as participants:
- FLS-Automation (Denmark)
- Neste (Finland)
- Borealis (Norway)
- Statoil (Norway)
- ABB (Sweden)
- Pfizer (Sweden)
- Ångpanneforeningen (Sweden)

The industry partners will pay as much of their own costs as possible.

12 The applicant's CV (maximum two pages).

Sirkka-Liisa Jämsä-Jounela graduated from Oulu University of Technology in 1978 where she majored in process control. After graduation she worked as a software development engineer. In 1981 she continued her research work at the Electrical Engineering Laboratory of the Technical Research Centre of Finland , and received her Licentiate of Technology Degree from Helsinki University of Technology in 1985.

Prof. Jämsä-Jounela has gained practical experience in working for a number of companies in the Finnish process industry. In 1983 she joined Kemira Engineering and worked as a control engineer at the Siilinjärvi phosphate plant. During 1987-1991 she was employed as a research scientist (industrial researcher) by the Academy of Finland and Kemira Oy. During 1987-1988 she was a visiting scholar at the Department of Metallurgical Engineer, University of Utah, USA, and received her doctoral degree from the Helsinki University of Technology in 1990. In 1991 she joined the Outokumpu Group, where she worked as a senior consultant and also received practical experience in international automation projects. Her main responsibility was designing the instrumentation and control systems and implementing and testing control strategies for the unit processes of mineral processing plants.

Prof. Jämsä-Jounela has also made MBA studies at the Helsinki School of Economics and Business Administration, at Glasgow University, United Kingdom and at the European Business School in Copenhagen, Denmark.

She took up her current position as Professor in Process Control at the Helsinki University of Technology in 1994. The laboratory provides education in process automation, mainly in the fields of Chemical Technology, Forest Products Technology and Materials Science and Rock Engineering. Prof. Jämsä-Jounela has supervised over 100 MSc exams and about 10 PhD students. She has published over 150 international conference and journal papers, mainly on process control and automation. She has given numerous invited lectures and plenaries in international conferences and workshops.

Prof. Jämsä-Jounela began her affiliation with IFAC in 1992 as a member of the TC Automation in Mining, Mineral and Metal Processing, and in 1996 she was appointed Chair of this Technical Committee (1996-2002). She has served the IPC chair in numerous events organized by IFAC and other international societies. She is currently serving as IFAC Vice President and Chair of the Technical Board. She is also the Chair of the Nordic Process Control Group. Prof. Jämsä-Jounela is a member of the Finnish Academy of Technologies.

13 A list of the applicant's publications (maximum 20 titles)

1. Sourander, M., Vermasvuori, M., Sauter, D., Jämsä-Jounela, S-L., Fault tolerant control for a dearomatisation process, Journal of Process Control, 2008 (1.review).
2. Komulainen,T., Rantala, A., Doyle, F., Jämsä-Jounela. S-L., Control of Industrial Copper Solvent Extraction Process, Journal of Process Control, submitted 2007, (1.review).
3. Nikus M., Cheng, H., Jämsä-Jounela, S-L., Evaluation of PCA methods with improved fault isolation capabilities on a paper machine simulator, Chemometrics and Intelligent Laboratory Systems, 2008, (in Print).
4. Vatanski, N., Georges, J-P., Aubrun, C., Rondeau, E., Jämsä-Jounela, S-L., Networked Control with Delay Measurement and Estimation, Control Engineering Practice, submitted 2007, (2.review).
5. Kettunen, M., Zhang, P., Jämsä-Jounela, S-L., Embedded Fault Detection, Isolation, Accommodation System in a Model Predictive Controller for an Industrial Benchmark Process, Computer & Chemical Engineering, submitted 2006, (in 2.review).
6. Cheng, H., Nikus, M., Jämsä-Jounela S-L., Fault Diagnosis of the paper machine short circulation process using novel dynamic causal digraph reasoning, Journal of Process Control, xxx(2008)xxx, in press doi:10.1016/j.jprocont.2007.12.003.
7. Kämpjärvi, P., Sourander, M., Komulainen, T., Nikus, M., Vatanski, N., Jämsä-Jounela, S-L., Online Analyser Validation and Process Fault Diagnosis for Ethylene Cracking Process under MPC Feedback, Control Engineering Practice, 16(2008)1-13. (DOI: 10.106/j.conengprac.2007.03.007).
8. Remes, A., Saloheimo,K., Jämsä-Jounela,S-L., Effects of On-line Elemental Analysis Speed and Accuracy on Flotation Control Performance, Minerals Engineering, 20(2007)1055-1066.
9. Komulainen, T., Pekkala, P., Rantala, A., Jämsä-Jounela, S.-L., Dynamic Modeling of an Industrial Copper Solvent Extraction Plant, Hydrometallurgy 81(2006)52-61.
10. Jämsä-Jounela, S-L., Vermasvuori, M., Kämpe,J., Koskela, K., Operator Support System for the Larox Pressure Filter, Control Engineering Practice, 13(2005)10, 1327-1337.
11. Komulainen, T., Sourander, M., Jämsä-Jounela, S-L., The Online Application of Dynamic PLS to Dearomatization Process, Computers & Chemical Engineering 28 (12) (2004)2611-2619.
12. Mc Avoy, T., Jämsä-Jounela, S-L., Patton, R., Perrier, M., Weber, H., Georgakis C., Milestone Report for Area 7 Industrial Applications, Control Engineering Practice 12 (2004)113-119.
13. Kämpjärvi, P., Jämsä-Jounela, S-L., Level control strategies for flotation cells, Minerals Engineering 16(2003)1061-1068.
14. Jämsä-Jounela, S-L, Vermasvuori, M., Endén, P., Haavisto, S., A process monitoring system based on the Kohonen selforganizing maps, Control Engineering Practice 11 (2003) 83-92.
15. Jämsä-Jounela, S-L., Current status and future trends in the automation of mineral and metal processing, Control Engineering Practice 9 (2001) 1021-1035.
16. Laine, S., Pulkkinen, K., Jämsä-Jounela, S-L., On-line determination of the concentrator feed type at Outokumpu Hitura Mine, Minerals Engineering 13 (2000) No 8-9, 881-895.
17. Järvensivu, M., Saari, K., Jämsä-Jounela, S-L., Intelligent Control System of an Industrial the Lime Kiln, Control Engineering Practice 9 (2001) 589-606. Control Engineering Practice Prize Paper Award, IFAC World Congress, Barcelona 2002.
18. Järvensivu, M., Mäenpää, T., Jämsä-Jounela, S-L., Saari, K., Field survey of the reduced sulfur emissions from a modern Finnish pulp mill, Environmental Progress 19 (2000) No 3, 147-156.
19. Jämsä-Jounela, S-L., Laine, S., Ruokonen, E., Ore type based expert systems in mineral processing plants, Part. Part. Sys. Charact. 15 (1998) 200-207.
20. Tenno, R., Jämsä-Jounela, S-L., Copper flotation profit and control system accuracy, Control Engineering Practice 4 (1996) No 11, 1545-1551.

14 A detailed budget for the three years of the network, including specific information on the various items in the budget (see point 10).
(Please note that a maximum of 10 % may be used for direct administrative costs.)

The main purpose of the Nordic Process Control Network will be promoting a more concrete collaboration between research groups representing different but complementary aspects of process control research, supporting graduate and post-graduate research training in this field and bridging between the academic and the industrial world filling the gap between theory and application. The target will be achieved enhancing visits in the different research groups belonging to the network.

Number of visits among the network participants per years: 27
Number of participant groups: 10

Cost for 1-visit (1-person)

Duration:	4 days
Daily allowance:	65,00 €/day
Hotel:	223,00 €/night
Flights:	270,00 €
Other transport costs:	50,00 €

Summarizing the following costs are considered (visit per person)

Accommodation:	670,00 €
Travel:	320,00 €
Honoraria:	250,00 €
Cost on 1-visit:	1 240,00 €

In NOK (8.0675 NOK / €, source: www.bof.fi - 18.3.2008):

Accommodation:	kr 5 405,00
Travel:	kr 2 582,00
Honoraria:	kr 2 017,00
Cost on 1-visit:	kr 10 004,00

In NOK	Annual budget per group:	kr 270 100
	Administration fee:	kr 29 900
	TOTAL	kr 300 000

The amounts are rounded for convenience in the part 10 (budget). The Currency rate and the ticket prices are checked 18.3.2008 and can change.

Industrial partners will cover their costs themselves and those costs are not included here.

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Bay Jørgensen	Sten	M	Professor

University	Academic degree
Technical University of Denmark (DTU)	Dr.Ing.
Department/Institution	Telephone (work)
Department of Chemical and Biochemical Engineering	+45 4525 2872
Dept. address	Telefax (work)
Søltofts Plands	+45 4593 2906

Postal code	City	Country	E-mail
2800	Kgs. Lyngby	Denmark	sbj@kt.dtu.dk

Subject area (See last page)

Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
Clement	Karsten	M	Docent
Davidescu	Florin Paul	M	PhD Student
Prado Rubio	Oscar Andres	M	PhD Student
Huusom	Jakob Kjøbsted	M	PhD Student
Abildskov	Jens	M	Associate Professor

Short description of the group and its activities

The Computer Aided Process Engineering Center (CAPEC) at The Technical University of Denmark is committed to fundamental and applied research in close collaboration with industry. CAPEC research is focussed upon themes such as "integration", "operation", "product/process", "environment", and "energy" with respect to oil, chemical, petrochemical, bio-chemical and pharmaceutical industries. CAPEC has developed and/or continues to develop computer-aided tools, which can be used to solve industrial problems. These tools are also used as the basis for development of new methods for process integration, for design of clean processes with lower energy consumption, for design of new products and for efficient/flexible operation of processes. In particular control of the operation of chemical plants is an essential activity within CAPEC. These activities are both at the theoretical level and on development of more practical approaches to enabling optimization of chemical production and operation of chemical products.

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Jørgensen	John Bagterp	Male	Assistant Professor

University	Academic degree
Technical University of Denmark	PhD
Department/Institution	Telephone (work)
Department of Informatics and Mathematical Modelling	+45 45253088
Dept. Address	Telefax (work)
Richard Petersens Plads, Building 305	

Postal code	City	Country	E-mail
2800	Kgs. Lyngby	Denmark	jbj@imm.dtu.dk

Subject area (See last page)

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
Völcker	Carsten	M	PhD student
NN			PhD student
NN			PhD student (to be hired)
NN			PhD student (to be hired)
NN			PhD student (to be hired)

Short description of the group and its activities

Control and Optimization of Dynamic Systems is one of the research topics addressed by the Scientific Computing Group at Department of Mathematics and Mathematical Modelling. Assistant Professor John Bagterp Jørgensen is the principal investigator in Control and Optimization of Dynamic Systems. We develop efficient numerical algorithms for high-performance computing in the areas of numerical simulation, optimization and control of dynamic systems. We use these algorithms for predictive control of oil recovery processes, industrial processes such as cement and rockwool production, and in biomedical devices e.g. the Artificial Pancreas for people with diabetes. Among others, we teach courses in numerical methods for differential equations, constrained optimization and model predictive control.

One class of applications that we address with our numerical methods and software is simulation, optimization and control of advanced oil recovery methods such as in-situ combustion and chemical flooding to enhance the efficiency of off-shore oil recovery in the Danish fields of the North Sea. Advanced oil recovery methods have a very high economic potential but are also risky. This project is part of the ADORE project involving several departments at DTU and Stanford University as well as Maersk Oil and Gas. 2 PhD-students and 1 Post Doc student will work on this in the Control and Optimization of Dynamic Systems research group in the period 2007-2012.

In collaboration with FLSmidth Automation A/S and an industrial PhD student we address new convex optimization formulations for Robust Model Predictive Control. The goal is to improve the control systems used in cement plants and to optimize cement production. Compared to traditional Model Predictive Control, these predictive controllers are able to more adequeately handle the large uncertainties inevetible in industrial cement production. A current research topic exploited together with Lieven Vandenberghe (UCLA) is Second-Order Cone Programming for robust MPC. The controllers resulting are applicable to a wide range of industrial processes and are currently also being investigated in connnection with production of Rockwool (building insulaiton material) in a mineral melting cupola furnace.

We also use Model Predictive Control as the software kernel in the Artificial Pancreas for peole with diabetes. The Artificial Pancreas is an automatic electro-mechanical system for continous administration of insulin to people with diabetes based on glucose measurements. We develop the model predictive controller that based on glucose measurements robustly computes the optimal amount of insulin to inject into the person. This project is a collaboration project with DTU Informatics, DTU systems biology, UCSB, Uppsala University, Hvidovre Hospital and Novo Nordisk A/S. At DTU 2 PhD students and 1 Post Doc will be hired in the summer of 2008 to work on the project in collaboration with 1 medical PhD student at Hvidovre Hospital. This project has been funded for the period 2008-2011.

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Jämsä-Jounela	Sirkka-Liisa	F	Professor

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Subject area (See last page)
Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
Ylinen	Raimo	M	Professor
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Nikus	Mats	M	Postdoctoral resercher
Zakharov	Alexey	M	Postdoctoral resercher
Vatanski	Nikolai	M	PhD Student
Vermasvuori	Mikko	M	PhD Student
Cheng	Hui	M	PhD Student

Short description of the group and its activities

The Laboratory of Process Control and Automation at the Helsinki University of Technology was founded in 1987. The laboratory is a part of the Department of Biotechnology and Chemical Technology.

The aim of the laboratory is to serve all fields of process technology -chemical, metallurgical and forest products - in terms of process automation.

As recent research topics, we mention:

* Supervisory and mill-wide control systems in process industry
* Applications of artificial intelligence in process industry
* Fault detection, diagnosis and remote support of processes and process equipment
* Modeling and simulation of chemical and hydrometallurgical processes

The various research projects carried out in the laboratory are strongly connected with the Finnish industry, developing solutions for challenging interdisciplinary problems. Process control, fault diagnosis and expert systems are applied in various field of the process industry as chemistry, metallurgy, mineral processing, pulp and paper and forest technology.

More information can be found on the Laboratory website:
http://kepo.tkk.fi/

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Häggblom	Kurt-Erik	M	Professor

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Subject area (See last page)
Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
Böling	Jari	M	Assistant Prof. (Univ. Lecturer)
Gustafsson	Tore	M	Associate Prof. (Docent, Lecturer)
Tötterman	Stefan	M	Doctoral Student
Toivonen	Hannu	M	Prof. (Dept. of Information Technologies)

Short description of the group and its activities

The following are the main research activities of the group at Process Control Laboratory at Åbo Akademi:

– Systems Identification and Uncertainty Modeling
The research focusses on identification and modelling for robust control of multivariable (MIMO) systems, in particular ill-conditioned ones. Typical examples of such processes are distillation columns and heat exchangers. In recent years it has been recognized that there are unsolved fundamental issues in areas such as "identification for control", "experimental design", "control-oriented uncertainty sets" and "subspace identification", which are all part of this research. Our approach to uncertainty modelling is based on data (or model) matching in the frequency domain, which gives rise to a tangential Nevanlinna-Pick interpolation problem. In relation to this research, we are also interested in some promising, relatively new, statistical techniques such as "support vector regression" and "independent component analysis".

– Plantwide Control
It has been claimed by recognized experts in the field that the synthesis of plantwide control structures is the most important design problem in process control. The central issue to be resolved is the translation of (implicit) operating objectives concerning the entire plant to sets of measured, controlled, and manipulated variables as well as their interconnections in a control system. The most common type of interconnection is a multiloop single-input single-output (SISO) control structure used in decentralized control. Our main interest is the analysis and design of robust and fault-tolerant decentralized control systems by taking (model) uncertainty into account.

– Multimodel Adaptive Control (MMAC)
Adaptive control is an appealing control technique for poorly known systems or systems with a changing behaviour. The traditional approach to adaptive control is to update model parameters and the controller design on-line based on measurements and the actual performance. A more recent approach, with better robustness properties, is to use a number of predetermined models and/or controllers and a switching mechanism for selecting the proper controller in a given situation. Here, the issues concerning the switching mechanism are the main challenge. We are interested in MMAC for control of strongly nonlinear systems (such as pH neutralization) and ill-conditioned ones (e.g. distillation).

– Systems Biology
Biological and biomedical research is undergoing revolutionary developments that are likely to have a lasting impact on society. In principle, complete sets of chemical reactions, interactions and dynamical structures through which molecules, cells and organs carry out specific functions can now be unravelled. It seems clear that a better understanding of biological systems is best aided by quantitative modelling and novel systems analysis tools. This suggests a systems-engineering approach, where a background in chemical engineering and process control is very suitable. We have recently started research on this topic. Currently, we are involved in a small project on the modelling of apoptosis (programmed cell death) together with other participants from the departmens of chemical engineering and information technologies as well as a group of cell biologists at Åbo Akademi.

– A pilot-scale distillation column and a pH neutralization process are used for practical tests in our research.

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Juslin	Kaj	M	Chief Research Scientist

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Subject area (See last page)
Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
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NN			(to be defined)

Short description of the group and its activities

Information on: http://www.vtt.fi/

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Skogestad	Sigurd	M	Department head/professor

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Subject area (See last page)
Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
Preisig	Heinz A.	M	Professor
Jacobsen	Magnus Glosli	M	PhD Student
Jäschke	Johannes	M	PhD Student
Dahl-Olsen	Håkon	M	PhD Student
Linhart	Andreas	M	PhD Student
Manum	Henrik	M	PhD Student
Panahi	Mehdi	M	PhD Student
Yelchuru	Ramprasad	M	PhD Student
Strandberg	Jens P.	M	PhD Student
Dones	Ivan	M	PhD Student

Short description of the group and its activities

The objective of our research is to develop simple yet rigorous methods to solve problems of engineering significance. We would like to provide the engineer with tools to assist in problem solving.

Main research areas:

* Feedback as a tool to reduce uncertainty (including robust control)
* Feedback as a tool to operate in new operating regimes (including stabilization of desired flow regimes)
* Controllability of processes (achievable control performance) (see my book for more details)
* Control structure design (Plantwide control)
* Self-optimizing control
* Design and control of distillation processes (continuous and batch)

More information can be found on: http://www.nt.ntnu.no/users/skoge/

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Foss	Bjarne	M	Professor

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Subject area (See last page)
Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
Hovd	Morten	M	Professor
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Snarheim	Dagfinn	M	PhD student
Gunnerud	Vidar	M	PhD Student
Suwartadi	Eka	M	PhD Student
Marafioti	Giancarlo	M	PhD Student
Scibilia	Francesco	M	PhD Student
Kresno	Ibrahim Hakim	M	PhD Student

Short description of the group and its activities

The objective is to use system-theoretic methods is to improve control. Especially the use of model-based and optimization-based control. The application areas are the process industries and the oil and gas industry.

Main research areas:

- Modelling
- System identification
- Optimization
- Model-based control
- Model-based estimation

More information can be found on the website: http://www.itk.ntnu.no/ansatte/Foss_Bjarne/

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Lie	Bernt	M	Department head/professor

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Subject area (See last page)

Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
Di Ruscio	David	M	Associate professor
Haugen	Finn	M	Associate professor
Chai	Qian	F	PhD student
Furenes	Beathe	F	PhD student
Videla	Juan	M	PhD student
Komperød	Magnus	M	PhD student

Short description of the group and its activities

The process control group (given above) works in the area of model based estimation and control, including classical/basic control, mechanistic modeling, empirical modeling/subspace methods, state and parameter estimation using modern state estimators, advanced control/MPC, etc. There is an associated sensor technology group which works with soft sensors, sensor networks, etc. The stated focus for RnD at Telemark University College, Faculty of Technology is ”Gas and Energy Systems”. This is manifested in cross-departmental co-operation with our Process, Energy and Environmental engineering department (strong groups in CFD, powder technology, etc.). The co-operation is centered around some current projects in e.g. (i) CO2-capturing and (ii) Biogas production. In addition, the group is involved in several industry networks ranging from paper industry (COST E36 on Modeling and Simulation in the Pulp and Paper Industry) to local energy production (IEA Annex 42 on micro-cogeneration for residential use). Finally, the group is involved in projects in the metallurgical/PV industry, and various projects with gas systems.

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Breitholtz	Claes	M	Professor

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Subject area (See last page)

Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position
NN			(to be defined)
NN			(to be defined)
NN			(to be defined)

Short description of the group and its activities

Information on: http://www.chalmers.se/s2/

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Jacobsen	Elling W.	M	Professor

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Subject area (See last page)
Technology

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Last name	First name	Sex	Position
Trane	Camilla	F	PhD student
Nordling	Torbjörn	M	PhD student
Sandberg	Henrik	M	Ass Professor

Short description of the group and its activities

The Automatic Control Lab at KTH consists of about 30 people, and performs research on modelling and control of industrial systems with applications in process control, systems biology and communication networks. Descriptions of ongoing research projects can be found at the group homepage http://www.ee.kth.se/control.

15 Presentation of participating groups (maximum one page per group)

Group leader's last name	First name	Sex	Position
Leonard	Annika	F	Technology consultant

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Subject area (See last page)

Technology

Other participants in the group (use more space if necessary)

Last name	First name	Sex	Position

Short description of the group and its activities

Process control projects, mainly within nuclear power plants and chemical process industries. Specialises in control structures and control philosophies, often in connection to process engineering and process optimisation.

All information must be included in this application form and submitted as one document file; appendices are not accepted.

The application must reach NordForsk no later than 4 April, 2008 at 16.00 hours, Norwegian time. (See NordForsk´s general guidelines for applicants)

The application form should be sent to NordForsk as an e-mail attachment to the e-mail address below. Note that the subject field must contain the type of activity and the name of applicant.

Please send the e-mail only once. A notification that the application has been received will be sent immediately by automatic e-mail. Please contact NordForsk, if you don't receive any confirmation.

Late applications will not be considered.

E-mail: soknad@nordforsk.org

www.nordforsk.org

Subject area

Humanities

- Language, Linguistics
- History
- Folklore, Ethnology
- Music
- History of Art, Architecture
- Theology, Religion
- Literature
- Philosophy
- Archaeology
- Film and Theatre
- Culture
- Other and combined subjects

Social Studies

- Law
- Economics
- Economic Geography
- Sociology
- Political Science
- Social Anthropology
- Psychology
- Pedagogy
- Media and Communication
- Other and combined subjects

Mathematics / Natural Science

- Mathematics
- Physics
- Chemistry
- Earth Sciences
- Biology
- Informatics
- Other and combined subjects

Medical subjects

- Medicine (Basic)
- Paraclinical Sciences
- Clinical Medicine
- Clinical Odontology
- Psychiatry
- Social Medicine
- Other and combined subjects

Technology

- Mining, Ore and Oil Technology
- Building and Construction
- Electronic, Electric technologies
- Machine Technology and Mechanics
- Physical Technology
- Shipping Technology
- Materials Technology
- Fishing and Fisheries Technology
- Other related subjects

Agricultural Technology

- Farming and horticulture
- Forestry
- Livestock
- Alimentation