



INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL  
TRAINING AT THE UNIVERSITY OF HELSINKI 2005–2010

# RC-Specific Evaluation of NODES – Networks and Distributed Systems

Seppo Saari & Antti Moilanen (Eds.)



Evaluation Panel: Natural Sciences



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University of Helsinki  
Administrative Publications 80/54  
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<b>Title:</b> International Evaluation of Research and Doctoral Training at the University of Helsinki 2005–2010 : RC-Specific Evaluation of NODES – Networks and Distributed Systems	<b>Type of publication:</b> Evaluations
<b>Summary:</b> <p>Researcher Community (RC) was a new concept of the participating unit in the evaluation. Participation in the evaluation was voluntary and the RCs had to choose one of the five characteristic categories to participate.</p> <p>Evaluation of the Researcher Community was based on the answers to the evaluation questions. In addition a list of publications and other activities were provided by the TUHAT system. The CWTS/Leiden University conducted analyses for 80 RCs and the Helsinki University Library for 66 RCs.</p> <p>Panellists, 49 and two special experts in five panels evaluated all the evaluation material as a whole and discussed the feedback for RC-specific reports in the panel meetings in Helsinki. The main part of this report is consisted of the feedback which is published as such in the report.</p> <p>Chapters in the report:</p> <ol style="list-style-type: none"> <li>1. Background for the evaluation</li> <li>2. Evaluation feedback for the Researcher Community</li> <li>3. List of publications</li> <li>4. List of activities</li> <li>5. Bibliometric analyses</li> </ol> <p>The level of the RCs' success can be concluded from the written feedback together with the numeric evaluation of four evaluation questions and the category fitness. More conclusions of the success can be drawn based on the University-level report.</p>	
<b>RC-specific information:</b>	
<b>Main scientific field of research:</b> Natural Sciences	<b>RC-specific keywords:</b> business networks, business services, collaboration management, congestion control, content centric networking, content distribution, context-awareness, contract-based governance of collaborations, distributed algorithms, human-computer interaction, information-centric networks, Internet, interoperability, interaction design, mobile applications, mobile communication, mobile computing, multimodal interfaces, peer-to-peer, pervasive computing, privacy, protocol performance, service-oriented computing, trust, ubiquitous computing, wireless Internet
<b>Participation category:</b> 2. Research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through	
<b>RC's responsible person:</b> Kangasharju, Jussi	
<b>Keywords:</b> Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community	
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## Foreword

The evaluation of research and doctoral training is being carried out in the years 2010–2012 and will end in 2012. The steering group appointed by the Rector in January 2010 set the conditions for participating in the evaluation and prepared the Terms of Reference to present the evaluation procedure and criteria. The publications and other scientific activities included in the evaluation covered the years 2005–2010.

The participating unit in the evaluation was defined as a Researcher Community (RC). To obtain a critical mass with university-level impact, the number of members was set to range from 20 to 120. The RCs were required to contain researchers in all stages of their research career, from doctoral students to principal investigators (PIs). All in all, 136 Researcher Communities participated in this voluntary evaluation, 5857 persons in total, of whom 1131 were principal investigators. PIs were allowed to participate in two communities in certain cases, and 72 of them used this opportunity and participated in two RCs.

This evaluation enabled researchers to define RCs from the “bottom up” and across disciplines. The aim of the evaluation was not to assess individual performance but a community with shared aims and researcher-training activities. The RCs were able to choose among five different categories that characterised the status and main aims of their research. The steering group considered the process of applying to participate in the evaluation to be important, which led to the establishment of these categories. In addition, providing a service for the RCs to enable them to benchmark their research at the global level was a main goal of the evaluation.

The data for the evaluation consisted of the RCs’ answers to evaluation questions on supplied e-forms and a compilation extracted from the TUHAT – Research Information System (RIS) on 12 April 2011. The compilation covered scientific and other publications as well as certain areas of scientific activities. During the process, the RCs were asked to check the list of publications and other scientific activities and make corrections if needed. These TUHAT compilations are public and available on the evaluation project sites of each RC in the TUHAT-RIS.

In addition to the e-form and TUHAT compilation, University of Leiden (CWTS) carried out bibliometric analyses from the articles included in the Web of Science (WoS). This was done on University and RC levels. In cases where the publication forums of the RC were clearly not represented by the WoS data, the Library of the University of Helsinki conducted a separate analysis of the publications. This was done for 66 RCs representing the humanities and social sciences.

The evaluation office also carried out an enquiry targeted to the supervisors and PhD candidates about the organisation of doctoral studies at the University of Helsinki. This and other documents describing the University and the Finnish higher education system were provided to the panellists.

The panel feedback for each RC is unique and presented as an entity. The first collective evaluation reports available for the whole panel were prepared in July–August 2011. The reports were accessible to all panel members via the electronic evaluation platform in August. Scoring from 1 to 5 was used to complement written feedback in association with evaluation questions 1–4 (scientific focus and quality, doctoral training, societal impact, cooperation) and in addition to the category evaluating the fitness for participation in the evaluation. Panellists used the international level as a point of comparison in the evaluation. Scoring was not expected to go along with a preset deviation.

Each of the draft reports were discussed and dealt with by the panel in meetings in Helsinki (from 11 September to 13 September or from 18 September to 20 September 2011). In these meetings the panels also examined the deviations among the scores and finalised the draft reports together.

The current RC-specific report deals shortly with the background of the evaluation and the terms of participation. The main evaluation feedback is provided in the evaluation report, organised according to the evaluation questions. The original material provided by the RCs for the panellists has been attached to these documents.

On behalf of the evaluation steering group and office, I sincerely wish to thank you warmly for your participation in this evaluation. The effort you made in submitting the data to TUHAT-RIS is gratefully acknowledged by the University. We wish that you find this panel feedback useful in many ways. The bibliometric profiles may open a new view on your publication forums and provide a perspective for discussion on your choice of forums. We especially hope that this evaluation report will help you in setting the future goals of your research.

Johanna Björkroth  
Vice-Rector  
Chair of the Steering Group of the Evaluation

#### **Steering Group of the evaluation**

Steering group, nominated by the Rector of the University, was responsible for the planning of the evaluation and its implementation having altogether 22 meetings between February 2010 and March 2012.

#### **Chair**

Vice-Rector, professor **Johanna Björkroth**

#### **Vice-Chair**

Professor **Marja Airaksinen**

Chief Information Specialist, Dr **Maria Forsman**

Professor **Arto Mustajoki**

University Lecturer, Dr **Kirsi Pyhälä**

Director of Strategic Planning and Development, Dr **Ossi Tuomi**

Doctoral candidate, MSocSc **Jussi Vauhkonen**



# Panel members

## **CHAIR**

### **Professor Jan-Otto Carlsson**

Materials science in chemistry and physics, nanotechnology, inorganic chemistry  
Uppsala University, Sweden

## **VICE-CHAIR**

### **Professor Jan van Leeuwen**

Computer science, information technology  
University of Utrecht, the Netherlands

### **Professor Caitlin Buck**

Probability and statistics, archeology, palaeoenvironmental science  
University of Sheffield, Great Britain

### **Professor David Colton**

Mathematics, inverse problems of acoustic and electromagnetic scattering  
University of Delaware, USA

### **Professor Jean-Pierre Eckmann**

Mathematics, dynamical systems, mathematical physics  
University of Geneva, Switzerland

### **Professor Ritske Huismans**

Geosciences, geodynamics  
University of Bergen, Norway

### **Professor Jukka Jurvelin**

Medical physics and engineering  
University of Eastern Finland

### **Professor Lea Kauppi**

Environmental sciences, water research  
The Finnish Environment Institute, Finland

### **Professor Riitta Keiski**

Chemical engineering, heterogeneous catalysis, environmental technology, mass and heat transfer processes  
University of Oulu, Finland

### **Professor Mats Larsson**

Experimental molecular physics, chemical dynamics, molecular spectroscopy, astrobiology  
Stockholm University, Sweden

### **Professor Holger Stark**

Medicinal, organic and pharmaceutical chemistry, pharmacology  
Johann Wolfgang Goethe Universität, Germany

The panel, independently, evaluated all the submitted material and was responsible for the feedback of the RC-specific reports. The panel members were asked to confirm whether they had any conflict of interests with the RCs. If this was the case, the panel members disqualified themselves in discussion and report writing.

Added expertise to the evaluation was contributed by the members from the other panels.

### **Experts from the Other Panels**

**Professor Barbara Koch**, from the Panel of Biological, Agricultural and Veterinary Sciences

**Professor Peter York**, from the Panel of Medicine, Biomedicine and Health Sciences

### **EVALUATION OFFICE**

**Dr Seppo Saari, Doc.**, Senior Adviser in Evaluation, was responsible for the entire evaluation, its planning and implementation and acted as an Editor-in-chief of the reports.

**Dr Eeva Sievi, Doc.**, Adviser, was responsible for the registration and evaluation material compilations for the panellists. She worked in the evaluation office from August 2010 to July 2011.

**MSocSc Paula Ranne**, Planning Officer, was responsible for organising the panel meetings and all the other practical issues like agreements and fees and editing a part the RC-specific reports. She worked in the evaluation office from March 2011 to January 2012.

**Mr Antti Mollanen**, Project Secretary, was responsible for editing the reports. He worked in the evaluation office from January 2012 to April 2012.

### **TUHAT OFFICE**

#### **Provision of the publication and other scientific activity data**

**Mrs Alja Kaltera**, Project Manager of TUHAT-RIS served the project ex officio providing the evaluation project with the updated information from TUHAT-RIS. The TUHAT office assisted in mapping the publications with CWTS/University of Leiden.

**MA Liisa Ekebon**, Assisting Officer, served in TUHAT-RIS updating the publications for the evaluation. She also assisted the UH/Library analyses.

**BA Liisa Jäppinen**, Assisting Officer, served in TUHAT-RIS updating the publications for the evaluation.

### **HELSINKI UNIVERSITY LIBRARY**

#### **Provision of the publication analyses**

**Dr Maria Forsman**, Chief Information Specialist in the Helsinki University Library, managed with her 10 colleagues the bibliometric analyses in humanities, social sciences and in other fields of sciences where CWTS analyses were not applicable.

## **Acronyms and abbreviations applied in the report**

### **External competitive funding**

AF – Academy of Finland  
TEKES - Finnish Funding Agency for Technology and Innovation  
EU - European Union  
ERC - European Research Council  
International and national foundations  
FP7/6 etc. /Framework Programmes/Funding of European Commission

### **Evaluation marks**

Outstanding (5)  
Excellent (4)  
Very Good (3)  
Good (2)  
Sufficient (1)

### **Abbreviations of Bibliometric Indicators**

P - Number of publications  
TCS – Total number of citations  
MCS - Number of citations per publication, excluding self-citations  
PNC - Percentage of uncited publications  
MNCS - Field-normalized number of citations per publication  
MNJS - Field-normalized average journal impact  
THCP10 - Field-normalized proportion highly cited publications (top 10%)  
INT\_COV - Internal coverage, the average amount of references covered by the WoS  
WoS – Thomson Reuters Web of Science Databases

### **Participation category**

Category 1. The research of the participating community represents the international cutting edge in its field.  
Category 2. The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.  
Category 3. The research of the participating community is distinct from mainstream research, and the special features of the research tradition in the field must be considered in the evaluation.  
Category 4. The research of the participating community represents an innovative opening.  
Category 5. The research of the participating community has a highly significant societal impact.

### **Research focus areas of the University of Helsinki**

Focus area 1: The basic structure, materials and natural resources of the physical world  
Focus area 2: The basic structure of life  
Focus area 3: The changing environment – clean water  
Focus area 4: The thinking and learning human being  
Focus area 5: Welfare and safety  
Focus area 6: Clinical research  
Focus area 7: Precise reasoning  
Focus area 8: Language and culture  
Focus area 9: Social justice  
Focus area 10: Globalisation and social change



# 1 Introduction to the Evaluation

## 1.1 RC-specific evaluation reports

The participants in the evaluation of research and doctoral training were Researcher Communities (hereafter referred to as the RC). The RC refers to the group of researchers who registered together in the evaluation of their research and doctoral training. Preconditions in forming RCs were stated in the Guidelines for the Participating Researcher Communities. The RCs defined themselves whether their compositions should be considered well-established or new.

It is essential to emphasise that the evaluation combines both meta-evaluation<sup>1</sup> and traditional research assessment exercise and its focus is both on the research outcomes and procedures associated with research and doctoral training. The approach to the evaluation is enhancement-led where self-evaluation constituted the main information. The answers to the evaluation questions formed together with the information of publications and other scientific activities an entity that was to be reviewed as a whole.

The present evaluation recognizes and justifies the diversity of research practices and publication traditions. Traditional Research Assessment Exercises do not necessarily value high quality research with low volumes or research distinct from mainstream research. It is challenging to expose the diversity of research to fair comparison. To understand the essence of different research practices and to do justice to their diversity was one of the main challenges of the present evaluation method. Understanding the divergent starting points of the RCs demanded sensitivity from the evaluators.

## 1.2 Aims and objectives in the evaluation

The aims of the evaluation are as follows:

- to improve the level of research and doctoral training at the University of Helsinki and to raise their international profile in accordance with the University's strategic policies. The improvement of doctoral training should be compared to the University's policy.<sup>2</sup>
- to enhance the research conducted at the University by taking into account the diversity, originality, multidisciplinary nature, success and field-specificity,
- to recognize the conditions and prerequisites under which excellent, original and high-impact research is carried out,
- to offer the academic community the opportunity to receive topical and versatile international peer feedback,
- to better recognize the University's research potential.
- to exploit the University's TUHAT research information system to enable transparency of publishing activities and in the production of reliable, comparable data.

## 1.3 Evaluation method

The evaluation can be considered as an enhancement-led evaluation. Instead of ranking, the main aim is to provide useful information for the enhancement of research and doctoral training of the participating RCs. The comparison should take into account each field of science and acknowledge their special character.

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<sup>1</sup> The panellists did not read research reports or abstracts but instead, they evaluated answers to the evaluation questions, tables and compilations of publications, other scientific activities, bibliometrics or comparable analyses.

<sup>2</sup> [Policies on doctoral degrees and other postgraduate degrees at the University of Helsinki.](#)

The comparison produced information about the present status and factors that have lead to success. Also challenges in the operations and outcomes were recognized.

The evaluation approach has been designed to recognize better the significance and specific nature of researcher communities and research areas in the multidisciplinary top-level university. Furthermore, one of the aims of the evaluation is to bring to light those evaluation aspects that differ from the prevalent ones. Thus the views of various fields of research can be described and research arising from various starting points understood better. The doctoral training is integrated into the evaluation as a natural component related to research. Operational processes of doctoral training are being examined in the evaluation.

**Five stages of the evaluation method were:**

1. Registration – Stage 1
2. Self-evaluation – Stage 2
3. TUHAT<sup>3</sup> compilations on publications and other scientific activities<sup>4</sup>
4. External evaluation
5. Public reporting

## **1.4 Implementation of the external evaluation**

### **Five Evaluation Panels**

Five evaluation panels consisted of independent, renowned and highly respected experts. The main domains of the panels are:

1. biological, agricultural and veterinary sciences
2. medicine, biomedicine and health sciences
3. natural sciences
4. humanities
5. social sciences

The University invited 10 renowned scientists to act as chairs or vice-chairs of the five panels based on the suggestions of faculties and independent institutes. Besides leading the work of the panel, an additional role of the chairs was to discuss with other panel chairs in order to adopt a broadly similar approach. The panel chairs and vice-chairs had a pre-meeting on 27 May 2011 in Amsterdam.

The panel compositions were nominated by the Rector of the University 27 April 2011. The participating RCs suggested the panel members. The total number of panel members was 50. The reason for a smaller number of panellists as compared to the previous evaluations was the character of the evaluation as a meta-evaluation. The panellists did not read research reports or abstracts but instead, they evaluated answers to the evaluation questions, tables and compilations of publications, other scientific activities, bibliometrics and comparable analyses.

The panel meetings were held in Helsinki:

- On 11–13 September 2011: (1) biological, agricultural and veterinary sciences, (2) medicine, biomedicine and health sciences and (3) natural sciences.
- On 18–20 September 2011: (4) humanities and (5) social sciences.

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<sup>3</sup> TUHAT (acronym) of Research Information System (RIS) of the University of Helsinki

<sup>4</sup> Supervision of thesis, prizes and awards, editorial work and peer reviews, participation in committees, boards and networks and public appearances.

## 1.5 Evaluation material

The main material in the evaluation was the RCs' self-evaluations that were qualitative in character and allowed the RCs to choose what was important to mention or emphasise and what was left unmentioned.

The present evaluation is exceptional at least in the Finnish context because it is based on both the evaluation documentation (self-evaluation questions, publications and other scientific activities) and the bibliometric reports. All documents were delivered to the panellists for examination.

Traditional bibliometrics can be reasonably done mainly in medicine, biosciences and natural sciences when using the Web of Science database, for example. Bibliometrics, provided by CWTS/The Centre for Science and Technology Studies, University of Leiden, cover only the publications that include WoS identification in the TUHAT-RIS.

Traditional bibliometrics are seldom relevant in humanities and social sciences because the international comparable databases do not store every type of high quality research publications, such as books and monographs and scientific journals in other languages than English. The Helsinki University Library has done analysis to the RCs, if their publications were not well represented in the Web of Science databases (RCs should have at least 50 publications and internal coverage of publications more than 40%) – it meant 58 RCs. The bibliometric material for the evaluation panels was available in June 2011. The RC-specific bibliometric reports are attached at the end of each report.

The panels were provided with the evaluation material and all other necessary background information, such as the basic information about the University of Helsinki and the Finnish higher education system.

### Evaluation material

1. Registration documents of the RCs for the background information
2. Self evaluation material – answers to the evaluation questions
3. Publications and other scientific activities based on the TUHAT RIS:
  - 3.1. statistics of publications
  - 3.2. list of publications
  - 3.3. statistics of other scientific activities
  - 3.4. list of other scientific activities
4. Bibliometrics and comparable analyses:
  - 4.1. Analyses of publications based on the verification of TUHAT-RIS publications with the Web of Science publications (CWTS/University of Leiden)
  - 4.2. Publication statistics analysed by the Helsinki University Library - mainly for humanities and social sciences
5. University level survey on doctoral training (August 2011)
6. University level analysis on publications 2005–2010 (August 2011) provided by CWTS/University of Leiden

### Background material

#### University of Helsinki

- [Basic information about the University of the Helsinki](#)
- [The structure of doctoral training at the University of Helsinki](#)
- Previous evaluations of research at the University of Helsinki – links to the reports: [1998](#) and [2005](#)

#### The Finnish Universities/Research Institutes

- [Finnish University system](#)
- [Evaluation of the Finnish National Innovation System](#)
- [The State and Quality of Scientific Research in Finland. Publication of the Academy of Finland 9/09.](#)

The evaluation panels were provided also with other relevant material on request before the meetings in Helsinki.

## 1.6 Evaluation questions and material

The participating RCs answered the following evaluation questions which are presented according to the evaluation form. In addition, TUHAT RIS was used to provide the **additional material** as explained. For giving the feedback to the RCs, the panellists received the evaluation feedback form constructed in line with the evaluation questions:

### 1. Focus and quality of the RC's research

- Description of
  - the RC's research focus.
  - the quality of the RC's research (incl. key research questions and results)
  - the scientific significance of the RC's research in the research field(s)
- Identification of the ways to strengthen the focus and improve the quality of the RC's research

The additional material: TUHAT compilation of the RC's publications, analysis of the RC's publications data (provided by University of Leiden and the Helsinki University Library)

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

### 2. Practises and quality of doctoral training

- Organising of the doctoral training in the RC. Description of the RC's principles for:
  - recruitment and selection of doctoral candidates
  - supervision of doctoral candidates
  - collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes
  - good practises and quality assurance in doctoral training
  - assuring of good career perspectives for the doctoral candidates/fresh doctorates
- Identification of the RC's strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.

The additional material: TUHAT compilation of the RC's other scientific activities/supervision of doctoral dissertations

A written feedback from the aspects of: processes and good practices related to leadership and management

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

### 3. The societal impact of research and doctoral training

- Description on how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).
- Identification of the ways to strengthen the societal impact of the RC's research and doctoral training.

The additional material: TUHAT compilation of the RC's other scientific activities.

A written feedback from the aspects of: societal impact, national and international collaboration, innovativeness

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)



#### **4. International and national (incl. intersectoral) research collaboration and researcher mobility**

- Description of
  - the RC's research collaborations and joint doctoral training activities
  - how the RC has promoted researcher mobility
- Identification of the RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.

A written feedback from the aspects of: scientific quality, national and international collaboration

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

#### **5. Operational conditions**

- Description of the operational conditions in the RC's research environment (e.g. research infrastructure, balance between research and teaching duties).
- Identification of the RC's strengths and challenges related to operational conditions, and the actions planned for their development.

A written feedback from the aspects of: processes and good practices related to leadership and management

- Strengths
- Areas of development
- Other remarks
- Recommendations

#### **6. Leadership and management in the researcher community**

- Description of
  - the execution and processes of leadership in the RC
  - how the management-related responsibilities and roles are distributed in the RC
  - how the leadership- and management-related processes support
    - high quality research
    - collaboration between principal investigators and other researchers in the RC
    - the RC's research focus
    - strengthening of the RC's know-how
- Identification of the RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes

#### **7. External competitive funding of the RC**

- The RCs were asked to provide information of such external competitive funding, where:
  - the funding decisions have been made during 1.1.2005-31.12.2010, and
  - the administrator of the funding is/has been the University of Helsinki
- On the e-form the RCs were asked to provide:
  - 1) The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation, EU, ERC, foundations, other national funding organisations, other international funding organisations), and
  - 2) The total sum of funding which the organisation in question had decided to allocate to the RCs members during 1.1.2005-31.12.2010.

Competitive funding reported in the text is also to be considered when evaluating this point.

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness, future significance

- Strengths
- Areas of development
- Other remarks
- Recommendations

#### **8. The RC's strategic action plan for 2011-2013**

- RC's description of their future perspectives in relation to research and doctoral training.

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance

- Strengths
- Areas of development

- Other remarks
- Recommendations

## 9. Evaluation of the category of the RC in the context of entity of the evaluation material (1-8)

The RC's fitness to the chosen participation category

A written feedback evaluating the RC's fitness to the chosen participation category

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

## 10. Short description of how the RC members contributed the compilation of the stage 2 material

Comments on the compilation of evaluation material

## 11. How the UH's focus areas are presented in the RC's research?

Comments if applicable

## 12. RC-specific main recommendations based on the previous questions 1-11

## 13. RC-specific conclusions

# 1.7 Evaluation criteria

The panellists were expected to give evaluative and analytical feedback to each evaluation question according to their aspects in order to describe and justify the quality of the submitted material. In addition, the evaluation feedback was asked to be pointed out the level of the performance according to the following classifications:

- outstanding (5)
- excellent (4)
- very good (3)
- good (2)
- sufficient (1)

Evaluation according to the criteria was to be made with thorough consideration of the entire evaluation material of the RC in question. Finally, in questions 1-4 and 9, the panellists were expected to classify their written feedback into one of the provided levels (the levels included respective descriptions, 'criteria'). Some panels used decimals in marks. The descriptive level was interpreted according to the integers and not rounding up the decimals by the editors.

## Description of criteria levels

### Question 1 – FOCUS AND QUALITY OF THE RC'S RESEARCH

#### Classification: Criteria (level of procedures and results)

#### Outstanding quality of procedures and results (5)

Outstandingly strong research, also from international perspective. Attracts great international interest with a wide impact, including publications in leading journals and/or monographs published by leading international publishing houses. The research has world leading qualities. The research focus, key research questions scientific significance, societal impact and innovativeness are of outstanding quality.

*In cases where the research is of a national character and, in the judgement of the evaluators, should remain so, the concepts of "international attention" or "international impact" etc. in the grading criteria above may be replaced by "international comparability".*

Operations and procedures are of outstanding quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are in alignment with the documentation. The ambition to develop the community together is of outstanding quality.

#### **Excellent quality of procedures and results (4)**

Research of excellent quality. Typically published with great impact, also internationally. Without doubt, the research has a leading position in its field in Finland.

Operations and procedures are of excellent quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of excellent quality.

#### **Very good quality of procedures and results (3)**

The research is of such very good quality that it attracts wide national and international attention.

Operations and procedures are of very good quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of very good quality.

#### **Good quality of procedures and results (2)**

Good research attracting mainly national attention but possessing international potential, extraordinarily high relevance may motivate good research.

Operations and procedures are of good quality, shared occasionally in the community. The improvement of research and other efforts are occasionally documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of good quality.

#### **Sufficient quality of procedures and results (1)**

In some cases the research is insufficient and reports do not gain wide circulation or do not have national or international attention. Research activities should be revised.

Operations and procedures are of sufficient quality, shared occasionally in the community. The improvement of research and other efforts are occasionally documented and operations and practices are to some extent in alignment with the documentation. The ambition to develop the community together is of sufficient quality.

### **Question 2 – DOCTORAL TRAINING**

### **Question 3 – SOCIETAL IMPACT**

### **Question 4 – COLLABORATION**

#### **Classification: Criteria (level of procedures and results)**

#### **Outstanding quality of procedures and results (5)**

Procedures are of outstanding quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are in alignment with the documentation. The ambition to develop the community together is of outstanding quality. The procedures and results are regularly evaluated and the feedback has an effect on the planning.

#### **Excellent quality of procedures and results (4)**

Procedures are of excellent quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of excellent quality. The procedures and outcomes are evaluated and the feedback has an effect on the planning.

#### **Very good quality of procedures and results (3)**

Procedures are of very good quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and

management are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of very good quality.

#### **Good quality of procedures and results (2)**

Procedures are of good quality, shared occasionally in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of good quality.

#### **Sufficient quality of procedures and results (1)**

Procedures are of sufficient quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are occasionally documented and operations and practices are to some extent in alignment with the documentation. The ambition to develop the community together is of sufficient quality.

### **Question 9 – CATEGORY**

Participation category – fitness for the category chosen

The choice and justification for the chosen category below should be reflected in the RC's responses to the evaluation questions 1–8.

1. *The research of the participating community represents the international cutting edge in its field.*
2. *The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.*
3. *The research of the participating community is distinct from mainstream research, and the special features of the research tradition in the field must be considered in the evaluation.* The research is of high quality and has great significance and impact in its field. However, the generally used research evaluation methods do not necessarily shed sufficient light on the merits of the research.
4. *The research of the participating community represents an innovative opening.* A new opening can be an innovative combination of research fields, or it can be proven to have a special social, national or international demand or other significance. Even if the researcher community in its present composition has yet to obtain proof of international success, its members can produce convincing evidence of the high level of their previous research.
5. *The research of the participating community has a highly significant societal impact.* The participating researcher community is able to justify the high social significance of its research. The research may relate to national legislation, media visibility or participation in social debate, or other activities promoting social development and human welfare. In addition to having societal impact, the research must be of a high standard.

#### **An example of outstanding fitness for category choice (5) <sup>5</sup>**

The RC's representation and argumentation for the chosen category were convincing. The RC recognized its real capacity and apparent outcomes in a wider context to the research communities. The specific character of the RC was well-recognized and well stated in the responses. The RC fitted optimally for the category.

- Outstanding (5)
- Excellent (4)
- Very good (3)
- Good (2)
- Sufficient (1)

The above-mentioned definition of outstanding was only an example in order to assist the panellists in the positioning of the classification. There was no exact definition for the category fitness.

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<sup>5</sup> The panels discussed the category fitness and made the final conclusions of the interpretation of it.

## 1.8 Timetable of the evaluation

The main timetable of the evaluation:

- |  |                       |
|--|-----------------------|
| 1. Registration                            | November 2010         |
| 2. Submission of self-evaluation materials | January–February 2011 |
| 3. External peer review                    | May–September 2011    |
| 4. Published reports                       | March–April 2012      |
| - University level public report           |                       |
| - RC specific reports                      |                       |

The entire evaluation was implemented during the university's strategy period 2010–2012. The preliminary results were available for the planning of the following strategy period in late autumn 2011. The evaluation reports will be published in March/April 2012. More detailed time schedule is published in the University report.

## 1.9 Evaluation feedback – consensus of the entire panel

The panellists evaluated all the RC-specific material before the meetings in Helsinki and mailed the draft reports to the evaluation office. The latest interim versions were on-line available to all the panellists on the Wiki-sites. In September 2011, in Helsinki the panels discussed the material, revised the first draft reports and decided the final numeric evaluation. After the meetings in Helsinki, the panels continued working and finalised the reports before the end of November 2011. The final RC-specific reports are the consensus of the entire panel.

The evaluation reports were written by the panels independently. During the editing process, the evaluation office requested some clarifications from the panels when necessary. The tone and style in the reports were not harmonized in the editing process. All the reports follow the original texts written by the panels as far as it was possible.

The original evaluation material of the RCs, provided for the panellists is attached at the end of the report. It is essential to notice that the exported lists of publications and other scientific activities depend how the data was stored in the TUHAT-RIS by the RCs.



## 2 Evaluation feedback

### 2.1 Focus and quality of the RC's research

- *Description of*
    - *the RC's research focus*
    - *the quality of the RC's research (incl. key research questions and results)*
    - *the scientific significance of the RC's research in the research field(s)*
  - *Identification of the ways to strengthen the focus and improve the quality of the RC's research*
- ASPECTS: Scientific quality, scientific significance, societal impact, innovativeness*

#### **Strengths**

The RC consists of seven leading groups in the area of networks and distributed systems, which jointly focus on the technical (and scientific) challenges of the ICT infrastructures for our society today and in the future. The research of the RC targets especially (a) collaborative networks and services, (b) wireless and ubiquitous computing and (c) human-computer interaction. The RC has an excellent international track record and represents one of the core areas of HIIT. The RC benefits from excellent scientific leadership and very active international collaborations.

The bibliometric record shows that the RC is very productive, with an expected emphasis on peer-reviewed conference publications in well recognized, high-level peer-reviewed (e.g. ACM, IEEE) conferences. For the field in question this is an excellent standard. However, there is good performance also in publishing articles in key journals and book chapters.

Members of the RC have considerable visibility in organizing committees and in program committees of numerous conferences.

The RC is also well recognized in transferring its expertise to industrial contexts, viz. in standardization bodies like the IETF, ISO, and the W3C consortium. The RC is an excellent group for the Department.

#### **Areas of development**

The RC has gone through its formative phases and expects to harvest now on the further collaboration between its constituent groups and through joint research projects.

#### **Other remarks**

The field of networking and distributed systems is at the core of many ICT applications and a field of great interest for industries like NOKIA, Ericsson and so on.

#### **Recommendations**

The RC is in an excellent position and the overall focus is very strong. The subject area of the RC is highly relevant and well-positioned in the foundational and technical research for modern ICT systems. Some details on the research agendas of the constituent groups and for the further collaboration as foreseen would be helpful.

**Numeric evaluation: 4.5 (Excellent)**

### 2.2 Practises and quality of doctoral training

- *Organising of the doctoral training in the RC. Description of the RC's principles for:*
  - *recruitment and selection of doctoral candidates*
  - *supervision of doctoral candidates*
  - *collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes*

- *good practises and quality assurance in doctoral training*
- *assuring of good career perspectives for the doctoral candidates/fresh doctorates*
- *Identification of the RC's strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.*
- *Additional material: TUHAT compilation of the RC's other scientific activities/supervision of doctoral dissertations*

**ASPECTS:** *Processes and good practices related to leadership and management*

### **Strengths**

The RC is responsible for both the master programme 'Networking and Services' and the PhD program in its subject area. The organization of the PhD program, and the recruitment and supervision of candidates follow the established, excellent practices of the Department of Computer Science. The doctoral program is very active and involves skills in key architectures, design methodologies and end-user requirements in the field (with emphasis on the future internet environment).

The career perspectives of the graduates are very good, not in the least because of the many opportunities in Finland's IT industry. PhD students are encouraged to take additional courses to prepare them for careers in industry.

The quality of the scientific staff is excellent and of a high international standard. The PhD program is part of the Helsinki Graduate School in CS, the Future Internet Graduate School, and the Network of Finnish Doctoral Programmes in Information Technology.

### **Areas of development**

The Doctoral programme is well targeted, and the areas of development are clearly embedded in the existing research initiatives. The collaborative environment and expected increase in joint research projects could require expertise in more than one subarea simultaneously.

As part of its action plan, the RC aims to have more positions for postdocs. This would indeed be an excellent facility to support both the program and the RC's research.

### **Other remarks**

Some additional information on specific courses for PhD students would be helpful. Also, how is the progress of PhD students monitored and reviewed?

Given the number of groups in this RC, the number of graduated PhD's (11 in the evaluated period) should be increasing somewhat in the future.

### **Recommendations**

Some further information on the cursory component of the PhD program would be helpful, viz. on how this component is kept up-to-date with research developments in the RC and in its subject area in general. What role will ICT Labs play for the graduate training? In addition, a view on (or, a role in) the developments in 'web science' may also be useful.

**Numeric evaluation: 4.5 (Excellent)**

## **2.3 The societal impact of research and doctoral training**

- *Description on how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).*
- *Identification of the ways to strengthen the societal impact of the RC's research and doctoral training.*
- *Additional material: TUHAT compilation of the RC's other scientific activities.*

**ASPECTS:** *Societal impact, national and international collaboration, innovativeness*

### **Strengths**

The focus on the challenges of the modern communication infrastructures, like the (future) Internet, offers a clear pathway to societal relevance. The RC has an excellent record of industrial cooperation and



actively contributes to leading standardization bodies like the IETF, ISO, the WWRF forum and the W3C consortium.

The RC has also led to a number of spin-offs and start-ups.

#### **Areas of development**

The current lines of action are important for a sustained societal impact.

#### **Other remarks**

The impact of networks and distributed systems, especially when focused on technologies for future and wireless internet, ranges from new products and services of companies to new communications options for individuals. The PR efforts may also require that insights from other sciences, viz. the social sciences, are taken into account.

#### **Recommendations**

The ever on-going development of smart gadgets and (wireless-) services requires that an authoritative party like the RC must continue to disseminate its knowledge to general bodies and the public. An active strategy for it is recommended.

**Numeric evaluation: 4 (Excellent)**

## **2.4 International and national (incl. intersectoral) research collaboration and researcher mobility**

- *Description of*
  - *the RC's research collaborations and joint doctoral training activities*
  - *how the RC has promoted researcher mobility*
- *Identification of the RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.*

*ASPECTS: Scientific quality, national and international collaboration*

#### **Strengths**

The RC has a high level of international collaborations and contacts, in the EU and worldwide (e.g. with ICSI). Nationally and locally the RC is also very well networked in collaborative structures, e.g. it is a strong participant in HIIT.

#### **Areas of development**

The RC is very active in its international and national collaborative networks. The subject area is fast moving, and peer-reviewed conferences will remain the key platform for the RC.

#### **Other remarks**

It would be helpful to know more about the role and benefits foreseen for the RC in the ICT Labs project of the EIT.

#### **Recommendations**

The RC should maintain its high level of external collaboration in research and in PhD training. Mobility of heavily occupied scientific staff should be facilitated in any way possible.

**Numeric evaluation: 4.5 (Excellent)**

## 2.5 Operational conditions

- *Description of the operational conditions in the RC's research environment (e.g. research infrastructure, balance between research and teaching duties).*
- *Identification of the RC's strengths and challenges related to operational conditions, and the actions planned for their development.*

**ASPECTS:** *Processes and good practices related to leadership and management*

### Strengths

The RC operates in the excellent research environment as provided in the Department of Computer Science. The benefits are clearly stated and convincing.

In addition, the RC has an excellent level of international and industry collaborations and projects (such as the Future Internet SHOK program). It gives optimal conditions for the high-level and internationally oriented PhD program.

### Areas of development

The RC's activities can be expected to develop in all dimensions. The new lab facility for empirical experiments will be an interesting new element in the research environment of the RC.

A challenge may be to keep (sufficiently many) good researchers in academia, i.e. to provide competitive conditions especially for young researchers.

### Other remarks

Some additional remarks concerning the balance between teaching, research supervision, and research acquisition for the RC members at different levels of seniority would be helpful.

### Recommendations

The possible interaction of PhD students with industry during their PhD studies viz. through research projects specifically aimed at it, may be a very attractive aspect of the subject area.

## 2.6 Leadership and management in the researcher community

- *Description of*
  - *the execution and processes of leadership in the RC*
  - *how the management-related responsibilities and roles are distributed in the RC*
  - *how the leadership- and management-related processes support*
    - *high quality research*
    - *collaboration between principal investigators and other researchers in the RC*
    - *the RC's research focus*
    - *strengthening of the RC's know-how*
- *Identification of the RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes*

**ASPECTS:** *Processes and good practices related to leadership and management*

### Strengths

The RC is responsible for both the master and the PhD program in its subject area. The RC has a leading role in its area (e.g. in HIIT). The leadership of the RC is strong and experienced.

### Areas of development

The interest of foreign students for studies in this field can be expected to grow.

### **Other remarks**

It is important that the acquisition- and management-related duties of the RC remain sufficiently balanced with the duties in research and education within the RC.

### **Recommendations**

The key targets of the RC, namely to further improve the collaboration and visibility of the research, are very important and should be supported with adequate resources.

## **2.7 External competitive funding of the RC**

- *The RCs were asked to provide information of such external competitive funding, where:*
  - *the funding decisions have been made during 1.1.2005–31.12.2010, and*
  - *the administrator of the funding is/has been the University of Helsinki*
- *On the e-form the RCs were asked to provide:*
  - 1) *The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation, EU, ERC, foundations, other national funding organisations, other international funding organizations), and*
  - 2) *The total sum of funding which the organisation in question had decided to allocate to the RCs members during 1.1.2005–31.12.2010.*

*Competitive funding reported in the text is also to be considered when evaluating this point.*

*ASPECTS: Scientific quality, scientific significance, societal impact, innovativeness and future significance*

### **Strengths**

The RC is funded well from a variety of sources, reflecting the prominent standing of the RC. Funding is received from both national (e.g. Academy of Finland and Tekes) and international sources (e.g. EU) and several industries including Nokia, Nokia Siemens Networks and so on. The sources reflect the nature of the research pursued in the RC.

### **Areas of development**

The research portfolio is likely to grow in this vibrant area.

### **Other remarks**

The RC would benefit from an ERC starting or senior grant.

### **Recommendations**

The RC may need to develop a long-term e.g 5-year perspective on the funding of its research effort, taking expected opportunities and uncertainties into account.

Are there more funding opportunities e.g. by the Finnish IT industry than currently exploited?

## **2.8 The RC's strategic action plan for 2011–2013**

- *RC's description of their future perspectives in relation to research and doctoral training.*

*ASPECTS: Scientific quality, scientific significance, societal Impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance*

### **Strengths**

The strategic action plan is clearly focused on the commitment to do world-class research.

### **Areas of development**

The RC aims at achieving further synergy between the constituent groups of the RC and at increasing various aspects of its operations as a leading group.

**Other remarks**

It would be helpful to have some further information on the actual research agendas of the groups.

**Recommendations**

The RC operates at an excellent level. The strategic actions will improve its position even further. The research agenda of the RC should remain central.

## **2.9 Evaluation of the category of the RC in the context of entity of the evaluation material (1-8)**

*The RC's fitness to the chosen participation category.*

*Category 2. The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.*

**Strengths**

The leading role and status of the RC is clear. Considering its aim to achieve increased synergy from the consorted effort, it is entirely appropriate that the RC chose for Participation Category 2: 'Research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through'.

**Recommendations**

The RC definitely has the potential to develop towards Participation Category 1. This is not only a realistic goal for the RC but it should also be facilitated by the Department.

**Numeric evaluation: 5 (Outstanding)**

## **2.10 Short description of how the RC members contributed the compilation of the stage 2 material**

The initial version of the material was compiled by the PI's of the RC. The material was commented and agreed upon by all PI's of the RC and subsequently given as input to the departmental strategy day. The members of the RC were all consulted on the material in final form and could submit their comments before the final submission of the material.

## **2.11 How the UH's focus areas are presented in the RC's research**

*Focus area 7: Precise reasoning*

Network and Distributed Systems is a field which fits both the science/mathematical and the design and engineering traditions of the Computer Science field. It fits the UH focus area 'Exact Thinking' (also called: Precise Reasoning) with a definite slant towards applications.

## **2.12 RC-specific main recommendations**

The RC does an excellent job in education and research. Its plans and ambitions to strengthen the synergy among the teams and to increase the visibility of its research and expertise are excellent and commendable.

Detailing the research agendas of the constituent groups and for their further collaboration as foreseen in the coming years would be helpful. This will be decisive for the teams working as an RC (depending on the further characteristics foreseen for RC's).

The doctoral program is well-targeted and follows the established, excellent practice of the Department of Computer Science. The program involves skills in key architectures, design methodologies as well as end-user requirements, with emphasis on the future internet environment. Some additional information on the specific courses for PhD students in the program would have been helpful. A challenge may be to keep (sufficiently many) good researchers in academia.

The ever on-going development of smart gadgets and (wireless-) services requires that an authoritative party like this RC continues to disseminate its knowledge to general bodies and the public. The RC should maintain its high level of external collaboration in research.

The RC may need to develop a long-term e.g. 5-year perspective on the funding of its research effort, taking expected opportunities and uncertainties into account. (Further funding opportunities within Finnish industry may be explored, and the RC should also look for opportunities at the EU level e.g. in the new *Horizon 2020* program.)

## 2.13 RC-specific conclusions

The RC is in an excellent stage of development and the overall focus is very strong. The subject area of the RC is highly relevant and well-positioned in the foundational and technical research for modern ICT systems. The RC is an important research community for the department.

## 2.14 Preliminary findings in the Panel-specific feedback

### PANEL-SPECIFIC FEEDBACK

The (meta-)evaluation is based solely on the documentation provided.

#### Quality in research and doctoral training

- **Research focus.** The RC focuses on the technical and scientific challenges of the ICT-infrastructures for our society today and in the future. The RC operates at an excellent level, and the teams aim to develop their joint research activities as an RC further.
- **Practices and quality of doctoral training.** The organization of the PhD program follows the established, excellent practices of the Department of Computer Science. The quality of the scientific staff is excellent. Some more information on the cursory component of the PhD program would have been helpful. A key target of the RC is to have more positions for postdocs.
- **Societal impact.** Research on the modern communication technologies and infrastructures like opportunistic networks and the future internet are clear pathways to societal relevance. The RC is having excellent societal impact through its record of industrial cooperation and active contribution to leading international standardization bodies. A key target of the RC is to increase the visibility of its research e.g. in popular channels.
- **International and national collaboration.** The RC is very active in international and national collaborative networks. Mobility of heavily occupied scientific staff should be facilitated in any reasonable way possible.
- **Leadership and management.** The scientific leadership of the RC is active and strong and carries the responsibility of several important research programs e.g. in HIIT. It is important that the duties of research, education and management remain sufficiently balanced within the RC. (It is not clear whether personnel management should be an issue for an RC or for the Department.)
- **External funding.** The RC is funded well from a variety of sources (including TEKES, industry etc), reflecting its prominent standing. The RC may need to develop a long-term perspective on the funding of its research, taking expected opportunities and uncertainties into account. (Are

there more funding opportunities e.g. by the Finnish IT-industry? What are the possibilities in the new Horizon 2020 program?)

- **Strategic action plan.** The strategic action plan is clearly focused on the commitment to do world-class research. The RC also aims to achieve further synergy between the constituent groups. It would be helpful to have more information on the actual research agendas of the groups.
  - **Findings.** The RC operates at an excellent level.
  - **Strengths.** The RC demonstrates excellent scientific standing in pursuing its research and does so in a good setting of industrial contracts and cooperation. The RC is clearly on the way to develop from category 2 to category 1.
  - **Potential development areas.** The research agenda of the RC should remain leading but should remain open for new challenges in this highly active field of IT. Maintaining and extending the high level of research and (doctoral) training will be important, including external funding.

# 3 Appendices

- A. Original evaluation material
  - a. Registration material – Stage 1
  - b. Answers to evaluation questions – Stage 2
  - c. List of publications
  - d. List of other scientific activities
- B. Bibliometric analyses
  - a. Analysis provided by CWTS/University of Leiden
  - b. Analysis provided by Helsinki University Library (66 RCs)



International evaluation of research and doctoral training  
at the University of Helsinki 2005-2010

RC-SPECIFIC MATERIAL FOR THE PEER REVIEW

NAME OF THE RESEARCHER COMMUNITY:  
Networks and Distributed Systems (NODES)

LEADER OF THE RESEARCHER COMMUNITY:  
Professor Jussi Kangasharju, Department of Computer Science, Helsinki Institute for  
Information Technology

RC-SPECIFIC MATERIAL FOR THE PEER REVIEW:

- Material submitted by the RC at stages 1 and 2 of the evaluation
  - STAGE 1 material: RC's registration form (incl. list of RC participants in an excel table)
  - STAGE 2 material: RC's answers to evaluation questions
- TUHAT compilations of the RC members' publications 1.1.2005-31.12.2010
- TUHAT compilations of the RC members' other scientific activities 1.1.2005-31.12.2010
- UH Library analysis of publications data 1.1.2005-31.12.2010 – results of UH Library analysis will be available by the end of June 2011

*NB! Since Web of Science(WoS)-based bibliometrics does not provide representative results for most RCs representing humanities, social sciences and computer sciences, the publications of these RCs will be analyzed by the UH Library (results available by the end of June, 2011)*





INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE  
UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

1 RESPONSIBLE PERSON

Name: Kangasharju, Jussi

E-mail:

Phone: 09 191 51379

Affiliation: Department of Computer Science, Helsinki Institute for Information Technology, U

Street address: Gustaf Hållströmin katu 2b

2 DESCRIPTION OF THE PARTICIPATING RESEARCHER COMMUNITY (RC)

Name of the participating RC (max. 30 characters): Networks and Distributed Systems

Acronym for the participating RC (max. 10 characters): NODES

Description of the operational basis in 2005-2010 (eg. research collaboration, joint doctoral training activities) on which the RC was formed (MAX. 2200 characters with spaces): NODES is a community of interacting research groups in the field of networks and distributed systems, ranging from Internet protocols, wireless communication and ubiquitous computing to new challenges pertaining to globally interoperating business services and human-computer interaction. Professors and researchers forming NODES are responsible for the teaching and organization of the Networking and Services master program at the Department of Computer Science. Our aim is to conduct world class research and educate experts and strategic leaders for the design and realization of new, global platforms or infrastructures. The PhD education involves instruments such as national doctoral programs, namely Helsinki Graduate School in Computer Science and Engineering (Hecse) and the Future Internet Graduate School (FIGS), and several international activities with leading universities such as the University of California at Berkeley and International Computer Science Institute (ICSI), University of Cambridge, and Tsinghua University.

At the same time, NODES forms the core of two out of four programs of Helsinki Institute for Information Technology HIIT. HIIT is a joint institute of the University of Helsinki and Aalto University, and several of the community members have a double affiliation with HIIT. NODES forms a majority of HIIT's Future Internet and Networked Society programs. Other members of these HIIT programs are an essential part of NODES, but being outside the University of Helsinki they are not fully covered by this assessment.

The focus areas are networked and distributed systems and their enablers: Internet protocols and architecture, mobility (technology and location independence, wireless computing), information networks and semantic data processing, distributed algorithms, interoperability (e.g., service and software platforms, interoperability management, contracting, trust management, privacy), context awareness, ubiquitous computing and human-computer interaction. The group combines the departmental tradition of wireless and mobile computing to new research themes.



INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE  
UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

3 SCIENTIFIC FIELDS OF THE RC

Main scientific field of the RC's research: natural sciences

RC's scientific subfield 1: Telecommunications

RC's scientific subfield 2: Computer Science, Theory and Methods

RC's scientific subfield 3: Computer Science, Information Systems

RC's scientific subfield 4: --Select--

Other, if not in the list: human-computer interaction

4 RC'S PARTICIPATION CATEGORY

Participation category: 2. Research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through

Justification for the selected participation category (MAX. 2200 characters with spaces): The NODES group at the Department of Computer Science was launched in 1995, covering the research in relation to the department's educational specialization line "Distributed systems and Data communication", later renamed to "Networking and Services". Since the leader of the group, Professor Kimmo Raatikainen, who had strong international impact on mobile computing, passed away in 2008, the group has undergone a renewal in personnel, also due to strategic additional investment by the department in additional professorships in the area. The leading research personnel consists to a large extent of professors appointed to the department during the last years: Jussi Kangasharju (2007), Sasu Tarkoma (2009) and Giulio Jacucci (2010). The new professors continue the tradition of mobile and wireless computing and complement it with information networking, cloud computing, ubiquitous computing and human computer interaction.

Our research is of high standard and has very good international visibility, but based on the enhanced resources and enlarged scope of activities of the group, we see a great opportunity over the next years to achieve still higher excellence in research.

5 DESCRIPTION OF THE RC'S RESEARCH AND DOCTORAL TRAINING

Public description of the RC's research and doctoral training (MAX. 2200 characters with spaces): The NODES research community conducts research, and master and doctoral education in the area of networking and services, distributed systems, ubiquitous computing and human-computer interaction at the University of Helsinki. The group educates global experts and strategic leaders for designing networks and services. It has significant impact in Finland through national PhD graduate schools and international activities. The community has high international visibility through scientific dissemination, demonstrations, and standardization activities. The NODES group involves six educationally active research groups, all providing a significant and independent research agenda but still supporting each other.



INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE  
UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

Adaptive Computing works on mobile context-aware systems, including adaptation and personalization, and on efficient distributed algorithms for optimization problems in, e.g., sensor networks.

Interactive Systems studies interface techniques, use and user engagement, and design in multitouch displays, adaptive and affective interfaces, multimodal interaction, and social computing.

Collaborative and interoperable computing group focuses on inter-organizational collaboration challenges. The group develops global infrastructure facilities, software engineering methodologies and tools, and control solutions that address also business requirements.

Collaborative Networking group focuses on large-scale systems and network applications based on cooperation. We investigate architectures and mechanisms for designing, prototyping, and testing of future networks.

Content-centric structures and networking group focuses on content centric networking. Content delivery and dissemination dominate Internet traffic. The research group investigates new solutions for content-centric data delivery.

Wireless Internet group studies the impact of the wireless and mobile networks to the behavior and performance of the Internet protocols and develops novel solutions for the future wireless and mobile networks.

Significance of the RC's research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): NODES is the only group in the whole University of Helsinki that performs research and provides both master and doctoral level education in the fields of computer communications, networking, ubiquitous computing, and human-computer interaction. The individual group leaders have excellent international visibility and are recognized as leading experts in their particular fields of research. The research of the group is of very high international standard and the achievements of the researchers bring lot of international visibility to the University of Helsinki.

The field of computer networking has a high industry demand both for MS and PhD level graduates. During the evaluation period 11 PhDs have graduated and have been positioned as professors or in leading expert positions at companies, both nationally and internationally. Key instruments for our doctoral training are national doctoral programs (e.g., FIGS and Hecse), local support at the department through mentoring and a PhD seminar, as well as our extensive international collaboration networks. Our doctoral education emphasizes skills required in designing networks and services as global utilities. The skills include understanding of a) maturity of global architectures and strategies on building sustainable large systems, b) interleaving the technological solution domains represented by the six NODES research groups, c) strong methodological understanding on validating the research results, d) strong emphasis on Internet as a utility,



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and e) requirements of end-user and regulatory governance placed on the complex systems under study. In practice, research projects combine conceptual and architectural development of longer strategic duration with technological solution improvements and innovations with mid-term goals. The focus areas of the NODES group are in harmony with major international trends (e.g., EU programs and roadmaps), but are ambitious in their goals.

Keywords: business networks, business services, collaboration management, congestion control, content centric networking, content distribution, context-awareness, contract-based governance of collaborations, distributed algorithms, human-computer interaction, information-centric networks, Internet, interoperability, interaction design, mobile applications, mobile communication, mobile computing, multimodal interfaces, peer-to-peer, pervasive computing, privacy, protocol performance, service-oriented computing, trust, ubiquitous computing, wireless Internet

#### 6 QUALITY OF RC'S RESEARCH AND DOCTORAL TRAINING

Justified estimate of the quality of the RC's research and doctoral training at national and international level during 2005-2010 (MAX. 2200 characters with spaces): The NODES group's research is of very high international level. The group has been active in many areas of networking, ubiquitous computing, human-computer interaction and collaboration infrastructures, and has been publishing at top quality international venues. For example, we have published at ACM SIGCOMM, ACM CHI, IEEE Infocom, ACM PODC, ACM IMC, Pervasive, Ubicomp, ACM eEnergy, IEEE EDOC, COOPIS and journals such as Distributed Computing, Computer Networks, IEEE Pervasive Computing, MONET, Human Computer Interaction and International Journal of Human Computer Studies, Information Systems Frontier. In the evaluation period, we have published over 60 papers in top level conferences and journals. The group members are very active in international collaboration with joint publications and participation in joint projects, e.g., in the EU framework programs 6 and 7. Members of the group have written several international textbooks and edited volumes in their subject areas. The group's research is of very high international standard, however, recent major changes in the group's composition mean that we have not yet had the time to fully realize the potential in the current composition of the NODES group.

In the evaluation period, researchers of the NODES group have received 6 best paper awards and 5 other research awards. We are very active in participating in conference organization committees, including the organization of Pervasive 2010 conference in Helsinki and memberships in program committees of top level conferences.

Our doctoral training is very active and we have graduated 11 PhDs in the evaluation period. Currently we have 15 active students and expect to graduate 2-3 students per year in the future. Several of our recent graduates have become professors in top Finnish universities and several others are postdocs at top level international universities or working in leading expert positions in industry, either in Finland or abroad. Our doctoral training is therefore efficient and our graduates go on to top level positions.

Comments on how the RC's scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces): Most of the traditional evaluation criteria and methods can be applied to the



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NODES group. However, it should be noted that in computer science in general and in networking in particular, conference publications represent a major part of the dissemination of research results. In the networking area, all conferences are rigorously peer-reviewed and are the main venues for publication, with the best conferences being considered equal or better to top journals. (See also the report "Research Evaluation in Computer Science" by Informatics Europe: [www.informatics-europe.org/docs/research\\_evaluation.pdf](http://www.informatics-europe.org/docs/research_evaluation.pdf)) For citation analysis in computer science, Google Scholar seems to have the best coverage and should be used to complement other sources of citation information, such as Web of Science.

NODES group has also been active in standardization of networking protocols, global system reference models and XML interchange, mainly at the Internet Engineering Task Force (IETF), ISO and W3C. Some of the standardization documents carry the names of the authors, while others do not mention each contributing author directly. The relevant documents published in the evaluation period are listed as part of our publications and in the evaluation it should be taken into account that the amount of work required for publishing, e.g., at IETF, is often equal or greater to publishing a good research paper. Standardization documents also go through an extensive peer review process. Therefore, we consider that in the evaluation they should be considered equal to category A3 publications.

Our publishing strategy emphasizes a wide dissemination in highly visible venues. As mentioned above, conferences play a crucial role in publishing in the networking area. Furthermore, conferences allow for a more rapid dissemination of results, which makes them the main target for our publication strategy. However, we also intend to publish fully mature results in the appropriate top level journals as well. The group already has several publications at top level conferences (as listed above) and we plan to continue to publish at the same level in the future.

## LIST OF RC MEMBERS

NAME OF THE RESEARCHER COMMUNITY:			Networks and Distributed Systems (NODES)		
RC-LEADER			J. Kangasharju		
CATEGORY			2		
	Last name	First name	PI-status (TUHAT, 29.11.2010)	Title of research and teaching personnel	Affiliation
1	Floréen	Patrik	x	Senior Researcher	Faculty of Science, Department of Computer Science & HIIT
2	Jacucci	Giulio	x	Professor	Faculty of Science, Department of Computer Science & HIIT
3	Kangasharju	Jussi	x	Professor	Faculty of Science, Department of Computer Science & HIIT
4	Kojo	Markku	x	Senior Researcher	Faculty of Science, Department of Computer Science
5	Kutvonen	Lea	x	Senior Researcher	Faculty of Science, Department of Computer Science
6	Tarkoma	Sasu	x	Professor	Faculty of Science, Department of Computer Science & HIIT
7	Alanko	Timo		Professor	Faculty of Science, Department of Computer Science
8	Hyvönen	Eero		Professor	Faculty of Science, Department of Computer Science
9	Manner	Jukka		Professor	Faculty of Science, Department of Computer Science & HIIT
10	Raatikainen	Kimmo		Professor	Faculty of Science, Department of Computer Science & HIIT
11	Karvi	Timo		Senior Researcher	Faculty of Science, Department of Computer Science
12	Hoggan	Eve		Postdoctoral Researcher	Faculty of Science, Department of Computer Science & HIIT
13	Norta	Alex		Postdoctoral Researcher	Faculty of Science, Department of Computer Science
14	Nurmi	Petteri		Postdoctoral Researcher	Faculty of Science, Department of Computer Science & HIIT
15	Suomela	Jukka		Postdoctoral Researcher	Faculty of Science, Department of Computer Science & HIIT
16	Daniel	Laila		Doctoral candidate	Faculty of Science, Department of Computer Science
17	Kangasharju	Jaakko		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT
18	Kauppinen	Tomi		Doctoral candidate	Faculty of Science, Department of Computer Science
19	Korhonen	Jouni		Doctoral candidate	Faculty of Science, Department of Computer Science
20	Leggio	Simone		Doctoral candidate	Faculty of Science, Department of Computer Science
21	Oulasvirta	Antti		Doctoral candidate	Faculty of Science, HIIT
22	Riva	Oriana		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT
23	Sarolahti	Pasi		Doctoral candidate	Faculty of Science, Department of Computer Science
24	Bhattacharya	Sourav		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT
25	Ding	Yi		Doctoral candidate	Faculty of Science, Department of Computer Science
26	Holi	Markus		Doctoral candidate	Faculty of Science, Department of Computer Science
27	Karkulahti	Ossi		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT
28	Korpela	Johannes		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT
29	Lagerspetz	Eemil		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT
30	Pervilä	Mikko		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT
31	Ruohomaa	Sini		Doctoral candidate	Faculty of Science, Department of Computer Science
32	Ruokolainen	Toni		Doctoral candidate	Faculty of Science, Department of Computer Science
33	Shen	Yiyun		Doctoral candidate	Faculty of Science, Department of Computer Science
34	Varjonen	Samu		Doctoral candidate	Faculty of Science, Department of Computer Science & HIIT



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RC-SPECIFIC STAGE 2 MATERIAL

BACKGROUND INFORMATION

Name of the RC's responsible person: Kangasharju, Jussi

E-mail of the RC's responsible person:

Name and acronym of the participating RC: Networks and distributed systems, NODES

The RC's research represents the following key focus area of UH: 7. Eksakti ajattelu – Exact thinking

Comments for selecting/not selecting the key focus area: Although our research has a strong application focus, computer science has its roots in mathematics and exact thinking.

1 FOCUS AND QUALITY OF RC'S RESEARCH (MAX. 8800 CHARACTERS WITH SPACES)

- **Description of the RC's research focus, the quality of the RC's research (incl. key research questions and results) and the scientific significance of the RC's research for the research field(s).**

The NODES group is based on the Department of Computer Science at the Faculty of Science. The group conducts research in the area of networking and services, distributed systems, ubiquitous computing and human-computer interaction. The community has high international visibility through scientific dissemination, demonstrations, and standardization activities. The NODES group involves seven educationally active research groups, all providing a significant and independent research agenda but still supporting each other.

Adaptive Computing led by Dr. Patrik Floréen works on mobile context-aware systems, including adaptation and personalization, and on efficient distributed algorithms for optimization problems in, e.g., sensor networks. The group's work intersects with the algorithms and machine learning subprogram of the Department.

Interactive Systems led by Prof. Giulio Jacucci studies interface techniques, use and user engagement, and design in multitouch displays, adaptive and affective interfaces, multimodal interaction, and social computing.

Collaborative and interoperable computing group led by Dr. Lea Kutvonen focuses on inter-organizational collaboration challenges. The group develops global infrastructure facilities, software engineering methodologies and tools, and control solutions that address also business requirements. The group's work intersects with the software systems subprogram of the Department.

Collaborative Networking group led by Prof. Jussi Kangasharju focuses on large-scale systems and network applications based on cooperation. The group investigates architectures and mechanisms for designing, prototyping, and testing of future networks.

Content-centric structures and networking group led by Prof. Sasu Tarkoma focuses on content centric networking. Content delivery and dissemination dominate Internet traffic. The research group investigates new solutions for content-centric data delivery.

Wireless Internet led by Markku Kojo group studies the impact of the wireless and mobile networks to the behavior and performance of the Internet protocols and develops novel solutions for the future wireless and mobile networks.



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Semantic Computing Research Group led by Prof. Eero Hyvönen focuses on studying machine-processable semantics and the development of methods for creating intelligent applications. The main field of activity has been the semantic web. Although affiliated with University of Helsinki and NODES in terms of research and doctoral training, most of the group is located at Aalto University.

Late Prof. Kimmo Raatikainen's group had strong impact on mobile computing and was internationally highly recognized. Other themes focused on Linux-oriented issues on and in the devices. Research scope covered use of Linux in different parts of the communication network, increasing the availability of the operating system, improving systems' real-time features and enhancing the service availability by seamless migration in case of node failures.

Three of the groups have been established in 2007-2010 and one was dissolved in that period. This means that we have not yet had the opportunities to build an efficient collaboration network between the individual groups, but are in the process of doing so. The full potential of the NODES group is therefore still to be realized.

Overall, the research of the individual groups in NODES is of very high international level. The group has been active in many areas of networking, ubiquitous computing, human-computer interaction and collaboration infrastructures, and has been publishing at top quality international venues. For example, we have published at ACM SIGCOMM, ACM CHI, IEEE Infocom, IEEE PerCom, ACM PODC, ACM IMC, Pervasive, Ubicomp, ACM eEnergy, IEEE EDOC, COOPIS and journals such as Distributed Computing, Computer Networks, IEEE Pervasive Computing, MONET, Human Computer Interaction, International Journal of Human Computer Studies, and Information Systems Frontier. In the evaluation period, we have published over 60 papers in top level conferences and journals. Overall, we have published consistently around 60-70 papers per year during the evaluation period.

The group members are very active in international collaboration with joint publications and participation in joint projects, e.g., in the EU framework programs 6 and 7. Members of the group have written several international textbooks and edited volumes in their subject areas. The group's research is of very high international standard, however, recent major changes in the group's composition mean that we have not yet had the time to fully realize the potential in the current composition of the NODES group.

In the evaluation period, researchers of the NODES group have received 6 best paper awards and 5 other research awards. We are very active in participating in conference organization committees, including the organization of Pervasive 2010, EDOC2011 and ACM SIGCOMM 2012 conferences in Helsinki. Furthermore, NODES members have participated in the organizing committees of over 30 conferences or workshops in the evaluation period, served on the technical program committee of over 140 conferences and workshops, and have served on the editorial board of several journals.

It must be strongly emphasized that in computer science in general and in networking in particular, conference publications represent a major part of the dissemination of research results. In the networking area, all conferences are rigorously peer-reviewed and are the main venues for publication, with the best conferences being considered equal or better to top journals. (See also the report "Research Evaluation in Computer Science" by Informatics Europe: [www.informatics-europe.org/docs/research\\_evaluation.pdf](http://www.informatics-europe.org/docs/research_evaluation.pdf)) For citation analysis in computer science, Google Scholar seems to have the best coverage and should be used to complement other sources of citation information, such as Web of Science. According to Google Scholar, the h-indexes of our active PIs are all





## INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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in the range of 13-20, with a clearly rising trend over the last few years, which is a good record given the relatively young scientific age of most of our PIs. Citation counts vary between 500 and 2000 per PI.

The NODES group has also been active in standardization of networking protocols, global system reference models and XML interchange, mainly at the Internet Engineering Task Force (IETF), Wireless World Research Forum (WWRF), ISO, and W3C. Some of the standardization documents carry the names of the authors, while others do not mention each contributing author directly. The relevant documents published in the evaluation period are listed as part of our publications and in the evaluation it should be taken into account that the amount of work required for publishing, e.g., at IETF, is often equal or greater to publishing a good research paper. Standardization documents also go through an extensive peer review process. Therefore, we consider that in the evaluation they should be considered equal to category A3 publications.

- **Ways to strengthen the focus and improve the quality of the RC's research.**

A major problem in Finnish academia is the lack of opportunities for postdocs. This trend is changing, both through the introduction of tenure track systems and funding of Academy of Finland now preferably being used for postdocs. Comparing NODES composition to leading European networking groups (e.g., Networking group at University of Cambridge led by Prof. Crowcroft), it is obvious that our lack of postdoctoral researchers is a shortcoming and is obviously a key development target to strengthen our group. We will seek to obtain more funding for postdocs and actively recruit internationally for these positions. Recently we have hired two international postdocs, W. Rao and E. Hoggan.

Our two key targets for our research are 1) to improve collaboration between NODES groups, build on our current joint projects, and write papers together and 2) to improve the visibility of our research. We will more actively target high-level conferences with excellent papers, but also try to raise the visibility of our work by encouraging our doctoral students to submit posters to the same venues.

#### 2 PRACTISES AND QUALITY OF DOCTORAL TRAINING (MAX. 8800 CHARACTERS WITH SPACES)

- How is doctoral training organised in the RC? Description of the RC's principles for recruitment and selection of doctoral candidates, supervision of doctoral candidates, collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes, good practises and quality assurance in doctoral training, and assuring good career perspectives for the doctoral candidates/fresh doctorates.

Our doctoral training follows the rules and processes set by the Department and Faculty of Science, therefore most of the following text discusses our doctoral training from the point of view of the Department. NODES-specific achievements have been highlighted and many of the practices described below have been initiated and piloted by NODES group.

We require each new student to have a committed supervisor and a high quality research plan at the time of application. The main recruitment channel is through the supervisors, who continuously screen for potential candidates among their students and research assistants. We use our international MS programs to help minimize risks in recruiting international students.

The final quality control phase resides by the PhD Studies Committee of the Department, which screens all applications. Only after the recommendation by the Committee can the student be enrolled at the University as a PhD student, and the task of the Committee is to make sure that ALL the elements of the submission - the research/supervision plan, study plan and the funding plan - are in order: the goal is to



## INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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ensure that all accepted students have a realistic chance to finish their doctoral degree in a reasonable time. The Faculty of Science has also adopted some of our processes and practices in their student admission process.

The admission process ensures that the student has a sound research plan linked to the activities of the supervisor's group. The group provides peer support and the group's activities help put the doctoral work in a larger context. Typically the day-to-day research is co-supervised by a post-doctoral or senior researcher.

In addition, each student has a support team of two mentors (typically professors or docents). Mentors are from outside of the student's group and in many cases from other universities participating in our joint doctoral programs. Mentors meet with the student at least once per year at our PhD student poster session, but more frequent contact is encouraged. Their role is to provide general advice and encouragement, as well as quality control external to the research group; they do not participate in daily supervision.

We collaborate within and through several national doctoral programs and networks. These include Hecse, FIGS, and FIGSIT. Positions in these doctoral programs are filled through internationally advertised open calls and the selection criteria are well-documented, and the processes are largely harmonized at the Department. The potential candidates for the doctoral programs are selected through a careful review process where each candidate is first reviewed by at least three (impartial) supervisors, after which the submissions are discussed openly among all the supervisors.

Aalto University and University of Helsinki also maintain a joint research institute HIIT, which hosts many of the research groups the PhD students work in.

The collaboration includes organization of joint special courses and planning and implementation of the student application processes. On the international level, we have held joint PhD student workshops with Rutgers University and Waseda University.

Two of our doctoral programs (Hecse, FIGS) are joint programs with Aalto University, and are affiliated programs with the European Institute for Innovation and Technology (EIT) ICT Labs Knowledge and Innovation Community (KIC), a new 100 ME/year European initiative bringing together five pre-eminent colocation sites (Helsinki, Berlin, Eindhoven, Paris, Stockholm). EIT ICT Labs offers new opportunities for international recruitment and international co-operation, and as a first step, the Finnish programs are planning a jointly organized summer school in August 2011 for the students of the whole KIC, with a special emphasis on training of transferable skills and entrepreneurship activities.

The quality of the doctoral training environment is the highest possible in Finland: our research and teaching staff have been found to be at the top level in several evaluations, and also the infrastructures for research and learning are excellent. The student selection processes described above guarantee that the selection process is fair, and that we will get the best of the candidates. The excellent track record of our graduates proves of the high quality of the overall process. In case of difficulties, the mentoring team system adopted at the Department is there to help the students. In case of financial problems near the end of the studies, the Department has in some cases given short-term funding for finalizing the dissertation, with good results. Internationalization is strongly supported, and extra funding is available for long- or short-term research visits and similar activities.



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The progress of the students is followed on a regular basis at the PhD student seminar, and on an annual basis by submitting an updated research and study plan to the PhD Studies Committee. At least once every year, each student is required to present a poster at a summer school or similar event, where the mentors will also be present.

Many of our students already have professional experience before starting their graduate studies, and many carry out their research in connection to Tekes-funded projects with industrial partners, gaining practical project experience: our research groups have especially strong links with the Finnish industry. Many supervisors have also several years of personal industrial experience.

Our students are encouraged to include in their studies basic courses on project management and industrial economics offered, e.g., by the Aalto Department of Industrial Engineering and Management. We expect the EIT ICT Labs to create new instruments for this type of activities, which our affiliated doctoral programs can use.

The NODES group has graduated 11 PhDs in the evaluation period. Currently we have 15 active students and expect to graduate 2-3 students per year in the future. More than half of our PhD students are of foreign origin. Several NODES PhD students have worked in industry during their doctoral studies as opposed to working at the Department. Typically our graduates have mostly gone into industry after graduation, but of the 11 PhDs graduated in the evaluation period 6 are working in academia (University of Helsinki, Aalto University, or HIIT) and the rest are in industry, mostly in Finland but 2 working abroad (one at Microsoft Research, other at Futurice Germany). Three of our graduates in the last 7 years have now become professors of computer science at University of Helsinki (Sasu Tarkoma), Aalto University (Jukka Manner), and University of Oulu (Andrei Gurtov).

- RC's strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.

The main strength of our doctoral training lies in the high quality of the research and teaching staff and the surrounding excellent infrastructure. The PIs work actively in the Finnish and international research community, creating opportunities for collaboration and academic career development. Collaboration with industry is frequent, offering opportunities for alternative career paths. The recruitment and selection processes are efficient and transparent. The progress of the students is monitored regularly by the supervisor, the mentors and the other members of the research staff.

One of the main challenges in this area is how to continuously succeed in recruiting the most talented students. Increased study times and drop-outs are also problems we face. Lack of a clear tenure track is a major issue facing our graduates.

We will emphasize international recruitment. It gives more opportunities, but finding the best talents is more challenging, so we need to make sure our selection criteria and processes are at an adequate level.

#### 3 SOCIETAL IMPACT OF RESEARCH AND DOCTORAL TRAINING (MAX. 4400 CHARACTERS WITH SPACES)

- Description of how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).

Our research questions are central to the practical operation of the Internet and networking applications, providing substantial contribution to society. NODES has established very intensive collaboration with industry, mainly through TEKES-funded joint projects with partial funding from



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companies but also through direct subcontracting from industry as well as European collaboration projects with substantial involvement of companies. This fosters knowledge exchange with industry. Major industrial partners include Elisa, Ericsson, Nokia, Nokia Siemens Networks and TeliaSonera. We also collaborate with research institutes and other organizations in the public sector such as VTT Technical Research Centre of Finland and Finnish Defence Forces. The number of industrial and other partners during the evaluation period is over 40 in total. The direct funding from industry makes up 20% of our total external funding. This is an indication of strong company interest in our research. In addition, two professors (Raatikainen, Tarkoma) have or have had positions at Nokia Research Center.

We have successfully contributed research results to international standardization bodies and other international forums. These include Internet Engineering Task Force (IETF), W3C, Wireless World Research Forum (WWRF), and ISO. Our contributions play a significant role in disseminating the research achievements by giving the results a practical dimension and evidence of their usefulness and enabling extremely wide impact with extensive, world-wide deployment of the developed technology. For instance, IETF's RFC 5682 - Forward RTO-Recovery (developed at NODES) - is deployed in major TCP/IP stacks, including Linux, HP Unix, and Windows. We also contribute to the Open Source Community, especially to networking stack development in the Linux kernel.

The NODES members serve many expert roles in international organizations (e.g., IANA, InterOp VLAB, and IFIP) and in various research and industry related functions of the EU, for example representing Finland in the COST activity, contributing to the Future Internet Assembly, and serving as proposal evaluators and project reviewers.

The research of NODES has contributed to several spin-offs and start-ups. MultiTouch Ltd. ([www.multitouch.fi](http://www.multitouch.fi)) is a company providing modular multitouch screens. The work was originally developed in a group lead by Prof. Giulio Jacucci. The company is now incorporated also in US and is among the leaders in its field. NODES members hold several patents in their areas. Note that for some topic areas, the relevant results are not patentable, or it is preferable to route results through standardization processes.

NODES members have appeared many times in national and international media, including TV, radio, and print. Most notably, the research work lead by Prof Jacucci appeared on national broadcasting in Finland and Italy and internationally in Euronews (<http://www.euronews.net/2010/02/12/energy-saving/>). Also the famous Citywall research appeared on news around the world on innumerable news sites and was also featured with a video on Youtube reaching over 290,000 views.

- Ways to strengthen the societal impact of the RC's research and doctoral training.

The main area of improvement in our societal impact lies in increasing our media visibility through popularization of research topics and results. Several aspects of our research have aspects appealing to a wider public and our challenge is in "getting the word out". Recent examples of successful cases of media attention include Prof. Jacucci's work mentioned above and Prof. Kangasharju's work on data center cooling. In meeting the goal of improved visibility, we need enhanced collaboration with the campus PR officer.

Naturally, keeping up our strong involvement in standardization will remain a key focus of NODES.



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#### 4 INTERNATIONAL AND NATIONAL (INCL. INTERSECTORAL) RESEARCH COLLABORATION AND RESEARCHER MOBILITY (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the RC's research collaborations and joint doctoral training activities and how the RC has promoted researcher mobility.

NODES has international faculty and faculty that has an international career. Prof. Jacucci is Italian graduated from the Politecnico di Milano after which he visited Germany (Fraunhofer IGD) and Austria (TU Wien). Prof. Kangasharju received his PhD from University of Nice Sophia Antipolis/Institut Eurecom and worked at Darmstadt University of Technology, first as post-doctoral researcher, and subsequently as assistant professor. Also several faculty members at postdoctoral level are recruited internationally as an example Dr. Hoggan completed her PhD at the University of Glasgow and Dr. Rao completed his PhD thesis at the Chinese University of Hong Kong.

Members of NODES have extensive international collaboration networks which are reflected in joint publications and projects. Collaboration with the International Computer Science Institute (ICSI) and iSchool (School of Information) at UC Berkeley has been a key strategic element in our international collaboration strategy. It was initiated by Prof. Raatikainen in the form of the FICNIA exchange project funded by TEKES and has subsequently been continued by Prof. Kangasharju in the FuNeSoMo exchange project, also funded by TEKES. These projects represent the strategic collaboration between Finland and UC Berkeley and they have been coordinated from the beginning by NODES.

Other targeted international cooperation include workshop series with Rutgers University DiscoLab (Prof Iftode) and Waseda University. We also have on-going collaboration with numerous academic institutions, such as Aarhus University (Denmark), Darmstadt University of Technology (Germany), DFKI (Germany), ETH Zurich (Switzerland), NICTA Canberra (Australia), Stony Brook University (USA), TU Braunschweig (Germany), University of Canterbury (New Zealand), and University of Otago (New Zealand).

Several international research projects support collaborative research activities with joint developments, experiments and publishing. We have also participated in several EU projects and also have experience in coordinating them. Naturally European project instruments for networking have been actively in use, including MINEMA and INTEROP NoEs.

Nationally, a key collaboration partner is Aalto University, in particular through the Helsinki Institute for Information Technology HIIT, which is a joint institute between our two universities. HIIT offers a unique platform for collaboration and we have a long track record of successful collaboration. Several NODES members are active in HIIT and three NODES members (Floréen, Jacucci, Kangasharju) are part of the HIIT steering group, actively contributing to the institute's strategy and development.

We also collaborate with many companies (as mentioned in point 3 above) and other universities and research institutes nationally. We have had several joint projects, ranging from small to large, strategic national initiatives (SHOK) where NODES members have actively been working in key roles in shaping up the research agenda and projects.

We are active in the EIT ICT Labs mentioned above. University of Helsinki is an affiliated member and contributes to several research and networking activities.



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- RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.

Our international research collaboration is on a good level and we are continuously looking for opportunities for expanding it through strategic collaboration with world-leading groups. Our good contacts to UC Berkeley and ICSI are a strong asset. Collaboration with companies is not only key to attract funding, but also as a major ingredient in the creative and grounded approach to research and teaching anchored to real world problems.

Main challenges are in improving both incoming and outgoing mobility. We need to attract excellent people from abroad, but also to increase our visits abroad. The NODES group has recently undergone major changes in its composition, which has, among others, caused a high teaching load on the members, making longer research visits of PIs hard to arrange. Now that the situation has stabilized, we expect to be able to support a normal program for sabbaticals for the PIs. We also strive to provide every PhD student with the possibility of a longer research visit during studies.

#### 5 OPERATIONAL CONDITIONS (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the operational conditions in the RC's research environment (e.g. research infrastructure, balance between research and teaching duties).

The Department of Computer Science provides an excellent research environment for NODES. The administrative and IT support works well, and adequate working space is available. The computing infrastructure is good. The new cluster Ukko was inaugurated in 2010. The cluster has 240 nodes, with 32GB of RAM and 2 quad-core CPUs each, with a 10 Gbps Ethernet network. Further infrastructure investments are under way.

The research institute HIIT, joint with Aalto University, has been and will continue to be a major platform for collaboration between these universities. For NODES, concerning networking, the most important departments within Aalto are the Department for Communications and Networking (COMNET) and the Department of Computer Science and Engineering, and concerning interaction research, the Aalto School of Art and Design's Department of Design. Most of the research of NODES falls in HIIT scope, and PIs Floréen, Jacucci, Kangasharju and Tarkoma also have an Aalto affiliation.

The Future Internet SHOK program is a major research initiative for NODES. Connected to this are the FICNIA and FuNeSoMo researcher exchange programs which consist of collaboration with UC Berkeley and International Computer Science Institute ICSI in Berkeley, California.

The major company collaborators are Nokia and Nokia Siemens Networks. NODES has extensive research funding through projects from the Academy of Finland, Tekes and EU, as well as direct company funding.

The teaching load of the professors and other teachers is high but negotiable; the student / teacher ratio in the Department is higher than internationally typical, about 40 enrolled students per member of teaching staff. The teaching program is up-to-date, covering important modern topics such as interaction design, programming on mobile devices and peer-to-peer networking. The Ukko cluster is naturally also used for teaching. MSc thesis advisory is emphasized and supports basic skills building for future PhD students. The Department recruits talented students to a research track already at the end of the first year of BSc studies. This track provides more challenging tasks and opportunities to participate in the research work. Summer internships have been provided to a large extent.



## INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

### RC-SPECIFIC STAGE 2 MATERIAL

NODES participates in the Future Internet Graduate School (FIGS), which is a joint venture of Aalto University, University of Helsinki and Tampere University of Technology since the beginning of 2010, and in the Helsinki Graduate School in Computer Science and Engineering (Hecse), joint with Aalto University. Earlier, MiNEMA summer and winter schools, funded by ESF, were important for research training. Doctoral students benefit from research workshops and the research collaboration, and are often employed in collaborative research projects. As a distinction of NODES in comparison to other parts of the Department, we have had several PhD students from industry, pursuing their studies while working in the company. This results in slower progress in the PhD studies than if they would be employed at the Department.

The work load of professors and principal investigators in applying for external funding retrieval is high, because funding agencies usually give only relatively short term decisions.

- RC's strengths and challenges related to operational conditions, and the actions planned for their development.

Our strengths are an excellent research infrastructure, extensive international and industry collaboration, and excellent researchers and students. We strive to provide a strong link between our research and teaching.

The main challenges are the teaching workload due to the high student/teacher ratio and the administrative load of struggling with short term external funding, common in Finland. Getting the most benefits from our recently installed research infrastructure will be an important challenge in the next years. Many of our best researchers move to industry early in their career, which presents a challenge for academia. Hopefully the new tenure track systems will provide some assistance in this respect, by providing better career paths for young researchers.

We are starting a new lab facility for empirical experiments in 2011. The lab will be used for networking experiments, wireless measurements, and user experience studies.

#### 6 LEADERSHIP AND MANAGEMENT IN THE RESEARCHER COMMUNITY (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the execution and processes of leadership in the RC, how the management-related responsibilities and roles are distributed in the RC and how the leadership- and management-related processes support high quality research, collaboration between principal investigators and other researchers in the RC, the RC's research focus and strengthening of the RC's know-how.

As Finnish professors have a great autonomy in their work, each PI is responsible for his/her research projects. NODES coordinates teaching of the Networking and Services area at the University, and organizes PhD student education jointly at the department level. Active research themes from all groups in NODES are reflected in advanced courses and research seminars as well as MSc topics. Coordination takes place in regular, open (even to students) planning and discussion sessions utilizing learning objectives, resourcing information, and strategic development methods for the curricula with long evolution perspective. PhD education processes are detailed in part 2 on doctoral training practices.

The NODES research community had three leading styles during the evaluation period. Late Prof. Kimmo Raatikainen practiced a leadership culture with centralized, need-to-know based processes on both research and educational areas (2005-2008). His priorities laid in external visibility. The number of MSc



## INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

### RC-SPECIFIC STAGE 2 MATERIAL

students were deliberately kept low by expressing high workload expectations; PhD students were mainly from industry, or working in industry projects.

From 2006 onwards a more network style organization between Raatikainen and Lea Kutvonen were created, while Kutvonen took over more of the educational related leadership tasks. The loss of Prof. Verkamo (Software systems) and Raatikainen in 2007/2008 required support and skills-coaching of the remaining staff, and guidance through change processes from Kutvonen. Staff recruitment was not possible due to ongoing professor position filling processes. Kutvonen systematically changed the management culture to one where each function area has more autonomy, but under quality control and well-expressed expectations and values. After professors Kangasharju, Tarkoma and Jacucci were appointed, and the Department received a new director, the leadership was transferred to Prof. Tarkoma in mid-2010.

Major change processes in NODES in 2005-2010 include

- loss of leading professor (Raatikainen); retirement of other key persons (T. Alanko, L. Marttinen)
- leadership style changes at the Department and within NODES
- change in number of research groups raised from 2 (mobility and wireless computing; interoperable and collaborative computing) to the current 7 groups as described above
- the Department changed the subprogram structure and introduced clearer profiles for research-based education; PhD student education was systematized more with examples from NODES group
- when old curricula requirements became obsolete in 2008, peak number of MSc students required advising; in preparation for this, staff was coached to do more efficient advising
- in 2009 decision was finally made to change advanced level teaching language to English; this required preparatory skills coaching
- recruitment of international students to MSc and PhD levels have been systematically increased according to the University of Helsinki strategy
- RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes.

Current leadership and management challenges relate to the major changes in leading of NODES as a group. The open culture should be preserved and built on to reach coherent research coordination. While the joint research strategy incorporates the PIs' research agendas, unified strategies are required to govern education, research quality improvement, NODES group structure improvement, and visibility goals. We will run regular research-oriented meetings for sharing and discussing, also involving students. We will also seek opportunities for several PIs participating in same externally funded projects.

The strengths in the group include enthusiasm to take leadership roles in relevant external communities. NODES has high impact on related groups in national Future Internet SHOK, and especially in HIIT, where NODES members lead two of HIITs four research programs and Floréen acts as deputy director

On the educational front, international student management is still forming up as we learn to manage larger groups with cultural and skill level differences.





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RC-SPECIFIC STAGE 2 MATERIAL

7 EXTERNAL COMPETITIVE FUNDING OF THE RC

- Listing of the RCs external competitive funding, where:
  - the funding decisions have been made during 1.1.2005-31.12.2010, and
  - the administrator of the funding is/has been the University of Helsinki
- Academy of Finland (AF) - total amount of funding (in euros) AF has decided to allocate to the RC members during 1.1.2005-31.12.2010: 1361830
- Finnish Funding Agency for Technology and Innovation (TEKES) - total amount of funding (in euros) TEKES has decided to allocate to the RC members during 1.1.2005-31.12.2010: 5323938
- European Union (EU) - total amount of funding (in euros) EU has decided to allocate to the RC members during 1.1.2005-31.12.2010: 570624
- European Research Council (ERC) - total amount of funding (in euros) ERC has decided to allocate to the RC members during 1.1.2005-31.12.2010: 0
- International and national foundations – names of international and national foundations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros).
  - names of the foundations:
  - total amount of funding (in euros) from the above-mentioned foundations: 0
- Other international funding - names of other international funding organizations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros).
  - names of the funding organizations:
  - total amount of funding (in euros) from the above-mentioned funding organizations: 0
- Other national funding (incl. EVO funding and Ministry of Education and Culture funded doctoral programme positions) - names of other national funding organizations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros).
  - names of the funding organizations: Nokia, Nokia Siemens Networks, Elisa, Finnish Defence Forces
  - total amount of funding (in euros) from the above-mentioned funding organizations: 1835299

8 RC'S STRATEGIC ACTION PLAN FOR 2011–2013 (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the RC's future perspectives in respect to research and doctoral training.

The NODES group aims at world class research supported by excellent research infrastructure. The recent professor appointments and research infrastructure investments are indicative of the Department's commitment to the groups research area.

The NODES research strategy consists of the research targets of the participating research groups. The joint target of large/global system intelligence and application is studied in member groups through different viewpoints, such as infrastructure development, engineering practices, interaction methods, and information and processing facilities improvement. The NODES group has excellent potential in



## INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

### RC-SPECIFIC STAGE 2 MATERIAL

addressing key challenges in the networking and mobile computing area in itself and especially in collaboration with its partners. In the Academy of Finland 2010 research assessment, especially user experience and usability research were mentioned as emerging themes. We have very good potential to perform high impact research in this area with the recent appointment of Prof. Jacucci and the new laboratory environment. The group has strong connections to HIIT's research programs, EIT, and Tivit (SHOKs); three of the PIs are members of the HIIT steering group and thus the NODES group is actively involved in developing HIIT's strategy, and implementing it. Enterprise interoperability themes are of high importance in EU FP7 and FP8 programs. There is also an active collaboration framework with universities in Europe, US, and China including Cambridge, ICSI, Rutgers, and Tsinghua.

The strategic actions in near future include

1. increasing collaboration between NODES PIs;
2. increasing number of postdoctoral researchers in NODES;
3. increasing visibility of high quality research internationally and nationally; and
4. increasing media visibility and popularization of research topics and results.

1. NODES PI collaboration has started well in terms of joint participation in TEKES and HIIT projects, for example. Additional research coordination and more elaborate meeting practice has been planned. Ongoing strategy work on collaborating organizations need to be scrutinized.

2. Continuing the already started recruitment of additional postdoctoral researchers is necessary for strengthening both empirical and theoretical research and PhD student instruction, but requires funds. Good recruitment and screening processes are already available through PhD student visit programs, joint doctoral programs, and participation in external research units (i.e. EIT KIC). We also expect the number of PhD graduates from NODES to increase.

3. In terms of increasing research quality and visibility, the key is high quality research articles and demonstrations at the leading international events. A goal of becoming comparative with Prof. Crowcroft's group from Cambridge is considered reachable in about 5-8 years, because a) already now the number of scientific publications is relatively stable at approximately 60-70 publications per year with an average of 10% of them in top quality conferences and journals, and b) scientific output and visibility of the NODES group is expected to increase in the near future with the newly appointed professors and the new research infrastructure. The NODES group is focusing on pertinent basic research problems and thus the number of Academy of Finland and EU projects is expected to increase. The tradition of empirical research is strengthened by the new lab facility starting in Spring 2011. Visibility is also built by the NODES group with already significant activity in organizing conferences, such as Pervasive, EDOC, and SIGCOMM; in future this international conference and workshop activity is growing, and PIs are frequent reviewers of conferences and journals

4. Increasing visibility in media and making research more approachable supports us in collecting funds, joint research activities and recruiting students and senior researchers. Activities in this category include popularization of research questions and results, alumni connections through the university and department level activities, and adopting a systematic practice of press releases through the university's new publicity strategies.



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RC-SPECIFIC STAGE 2 MATERIAL

9 SHORT DESCRIPTION OF HOW THE RC MEMBERS HAVE CONTRIBUTED TO THE COMPILATION OF THE STAGE 2  
MATERIALS (MAX. 1100 CHARACTERS WITH SPACES).

The PIs of the NODES group met several times, both during the first stage and the second stage (January/February 2011), and jointly agreed on the lead-PI for a particular section for the stage 2 documents. Other PIs commented and edited the text produced by the lead-PI of the section. The final version of the text was jointly agreed by the PIs. Section 2 about doctoral training was done in collaboration with the other RCs of the Department of Computer Science, as the Department has unified procedures for this.

The material for all the RCs of the Department (ALKO, NODES, SOFTSYS) was also discussed during the Department's strategy day on January 13, 2011, and all members of the RCs had a possibility to comment. In addition, the NODES material was sent to all the members of the NODES group prior to final submission for commenting and their comments were incorporated in the text where appropriate.



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## RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

NODES/Kangasharju

### 1 Analysis of publications

- Associated person is one of Patrik Florén , Giulio Jacucci , Jussi Kangasharju ,  
Markku P I Kojo , Lea Kutvonen , Sasu Tarkoma , Timo Alanko ,  
Eero Hyvönen , Jukka Manner , Kimmo Raatikainen , Timo Karvi ,  
Eve Hoggan , Alexander Norta , Petteri Tapio Nurmi , Jukka  
Suomela , Laila Daniel , Jaakko Juhani Kangasharju, Tomi Kauppinen, Jouni Korhonen, Simone Leggio, Oriana  
Riva, Pasi Sarolahti, Sourav Bhattacharya , Yi Ding , Markus Holi, Ossi Karkulahti ,  
Johannes Korpela , Emil Lagerspetz , Mikko Pervilä , Sini Ruohomaa ,  
Toni Ruokolainen , Yiyun Shen , Samu Varjonen ,

Publication type	Publication Year						Total Count 2005 - 2010
	2005	2006	2007	2008	2009	2010	
A1 Refereed journal article	7	4	8	6	7	5	37
A3 Contribution to book/other compilations (refereed)	5	6	11	4	8	4	38
A4 Article in conference publication (refereed)	38	38	43	39	37	32	227
B1 Unrefereed journal article	3	1		1	1		6
B2 Contribution to book/other compilations (non-refereed)	7						7
B3 Unrefereed article in conference proceedings	6	8	8	2	1	4	29
C1 Published scientific monograph	4			2	2	3	11
C2 Edited book, compilation, conference proceeding or special issue of journal	9	3	4	2	3	3	24
D1 Article in professional journal						3	3
D2 Article in professional hand or guide book or in a professional data system, or text book material		3					3
D4 Published development or research report						1	1
E1 Popular article, newspaper article	1			2			3
I2 ICT programs or applications				1	3		4



## INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

### RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

NODES/Kangasharju

## 2 Listing of publications

### A1 Refereed journal article

#### 2005

- Floreen, P, Kaski, P, Kohonen, J, Orponen, P **2005**, 'Exact and approximate balanced data gathering in energy-constrained sensor networks', **Theoretical Computer Science**, vol 344, no. 1, pp. 30-46.
- Floreen, P, Kaski, P, Kohonen, J, Orponen, P **2005**, 'Lifetime maximization for multicasting in energy-constrained wireless networks', **IEEE Journal on Selected Areas in Communications**, vol 23, no. 1, pp. 117-126.
- Hyvönen, E, Mäkelä, E, Salminen, MSI, Valo, A, Viljanen, KEA, Saarela, SJM, Junnila, MJ, Kettula, S **2005**, 'MuseumFinland - Finnish Museums on the Semantic Web', **Web semantics science, services and agents on the World Wide Web**, vol 3, no. 2-3, pp. 224-241.
- Karvi, T, Tienari, M, Kaivola, R **2005**, 'Stepwise development of process-algebraic specifications in decorated trace semantics', **Formal Methods in System Design**, vol 26, pp. 293-317.
- Kauppinen, T, Koskela, A, Diemling, M, Keski-Rahkonen, A, Sihvola, E, Ahonen, A **2005**, 'Comparison of manual and automated quantification methods of I-123-ADAM', **Nuklearmedizin**, vol 44, no. 5, pp. 205-212.
- Leggio, S, Manner, J, Raatikainen, K **2005**, 'Achieving seamless mobility in ip-based radio access networks', **IEEE Wireless Communications Magazine**, vol 12, no. 1, pp. 54-59.
- Nokelainen, P, Miettinen, M, Kurhila, J, Floreen, P, Tirri, H **2005**, 'A shared document-based annotation tool to support learner-centred collaborative learning', **British Journal of Educational Technology**, vol 36, no. 5, pp. 757-770.

#### 2006

- Källström, L, Leggio, S, Manner, J, Mikkonen, T, Raatikainen, K, Saarinen, J, Suoranta, S, Ylä-Jääski, A **2006**, 'A framework for seamless service interworking in ad-hoc networks', **Computer Communications**, vol 29, no. 16, pp. 3277-3294.
- Ruohomaa, S, Kutvonen, L **2006**, 'Luottamuksenhallinta avoimissa palveluverkoissa', **Tietojenkäsittelytiede**.
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#### 2007

- Aitenbichler, E, Kangasharju, J, Mühlhäuser, M **2007**, 'MundoCore: A Light-weight Infrastructure for Pervasive Computing', **Pervasive and Mobile Computing**, vol 3, no. 4, pp. 332-361.
- Hyvönen, E, Viljanen, K, Suominen, O, Hukka, E **2007**, 'HealthFinland: publishing health promotion information on the semantic web', **Technology and Health Care**, vol 15, no. 5, pp. 325.
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- Koskela, AK, Keski-Rahkonen, A, Sihvola, E, Kauppinen, T, Kaprio, J, Ahonen, A, Rissanen, A **2007**, 'Serotonin transporter binding of [I-123]ADAM in bulimic women, their healthy twin sisters, and healthy women: a SPET study', **BMC Psychiatry**, vol 7.
- Kutvonen, L, Metso, J, Ruohomaa, S **2007**, 'From trading to eCommunity management: responding to social and contractual challenges', **Information Systems Frontiers**, vol 9, no. 2-3, pp. 181-194.
- Kutvonen, L, Ruokolainen, T, Metso, J **2007**, 'Interoperability middleware for federated business services in web-Pilarcos', **International journal of enterprise information systems**, vol 3, no. 1, pp. 1-21.
- Norta, A, Grefen, P **2007**, 'Discovering patterns for inter-organizational business process collaboration', **International Journal of Cooperative Information Systems**, vol 16, no. 3-4, pp. 507-544.
- Suomela, J **2007**, 'Approximability of identifying codes and locating-dominating codes', **Information Processing Letters**, vol 103, no. 1, pp. 28-33.

#### 2008

- Daniel, L, Kojo, M **2008**, 'Employing cross-layer assisted TCP algorithms to improve TCP performance with vertical handoffs', **International Journal of Communication Networks and Distributed Systems**, vol 1, no. 4/5/6, pp. 433-465.
- Kangasharju, J, Lindholm, T, Tarkoma, S **2008**, 'XML security with binary XML for mobile Web services', **International Journal of Web Services Research**, vol 5, no. 3, pp. 1-19.



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### RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

#### NODES/Kangasharju

Kaski, P, Penttinen, A, Suomela, J **2008**, 'Coordinating concurrent transmissions: A constant-factor approximation of maximum-weight independent set in local conflict graphs', **Ad-Hoc & Sensor Wireless Networks**, vol 6, no. 3-4, pp. 239-263.

Koskela, A, Kauppinen, T, Keski-Rahkonen, A, Sihvola, E, Kaprio, J, Rissanen, A, Ahonen, A **2008**, 'Brain serotonin transporter binding of [1-123]ADAM: Within-subject variation between summer and winter data: within-subject variation between summer and winter data', **Chronobiology International**, vol 25, no. 5, pp. 657-665.

Saarienen, J, Mikkonen, T, Tarkoma, S, Heikkinen, J, Pitkänen, R **2008**, 'Towards a Server-Centric Interaction Architecture for Wireless Applications', **KSII Transactions on Internet and Information Systems**, vol 2, no. 2, pp. 103-119.

van Sinderen, M, Johnson, P, Kutvonen, L **2008**, 'Report on the IFIP WG5.8 International Workshop on Enterprise Interoperability (IWEI 2008)', **ACM SIGMOD Record**, vol 37, no. 4, pp. 112-114.

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Bremner-Barr, A, Chen, N, Kangasharju, J, Mokryn, O, Shavitt, Y **2009**, 'Bringing order to BGP: Decreasing time and message complexity', **Computer Networks**, vol 53, no. 12, pp. 2241-2256.

Hardman, L, van Osssenbruggen, J, Aroyo, L, Hyvönen, E **2009**, 'Using AI to Access and Experience Cultural Heritage', **IEEE Intelligent Systems**, vol 24, no. 2, pp. 23-25.

Kukkonen, J, Lagerspetz, E, Nurmi, P, Andersson, M **2009**, 'BeTeGeuse: a platform for gathering and processing situational data', **IEEE Pervasive Computing**, vol 8, no. 2, pp. 49-56.

Lindholm, T, Kangasharju, J, Tarkoma, S **2009**, 'Syxaw: Data Synchronization Middleware for the Mobile Web', **Mobile Networks and Applications**, vol 14, no. 5, pp. 661-676.

Miranda, H, Leggio, S, Rodrigues, L, Raatikainen, K **2009**, 'An algorithm for dissemination and retrieval of information in wireless ad hoc networks', **Concurrency and Computation: Practice & Experience**, vol 21, pp. 889-904.

Polishchuk, V, Suomela, J **2009**, 'A simple local 3-approximation algorithm for vertex cover', **Information Processing Letters**, vol 109, no. 12, pp. 642-645.

Suominen, O, Hyvönen, E, Viljanen, K, Hukka, E **2009**, 'HealthFinland: a national semantic publishing network and portal for health information', **Web semantics science, services and agents on the World Wide Web**, vol 7, no. 4, pp. 287-297.

#### **2010**

Floréen, P, Kaski, P, Polishchuk, V, Suomela, J **2010**, 'Almost Stable Matchings by Truncating the Gale-Shapley Algorithm', **Algorithmica**, vol 58, no. 1, pp. 102-118.

Hyvönen, E **2010**, 'Preventing Interoperability Problems Instead of Solving Them', **Semantic Web – Interoperability, Usability, Applicability**, vol 1, no. 1-2, pp. 33-37.

Kauppinen, T, Mantegari, G, Paakkari, P, Kuittinen, H, Hyvönen, E, Bandini, S, Semantic Computing Research Group (SeCo), The Aalto University School of Science and Technology and University of Helsinki, Finland **2010**, 'Determining relevance of imprecise temporal intervals for cultural heritage information retrieval', **International Journal of Human-Computer Studies**, vol 68, no. 9, pp. 549-560.

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Ruohomaa, S, Kutvonen, L **2010**, 'Trust and Distrust in Adaptive Inter-enterprise Collaboration Management', **Journal of Theoretical and Applied Electronic Commerce Research**, vol 5, no. 2 / Special Issue on Trust and Trust Management, pp. 118-136.

### A3 Contribution to book/other compilations (refereed)

#### **2005**

Kutvonen, L, Ruokolainen, T, Metso, J, Haataja, J **2005**, 'Interoperability middleware for federated enterprise applications in web-Pilarcos', **Interoperability of enterprise software and applications**, Springer, New York, NY.

Raatikainen, K **2005**, 'Wireless internet: challenges and solutions', **Modernin informaatioteknologian menetelmätutkimusta, Petroskoin yliopisto, Petroskoi**, pp. 20-74.

Raatikainen, K, Hohl, F, Tarkoma, S **2005**, 'Generic service elements for adaptive applications', in R Tafazolli (ed.), **Technologies for the wireless future. Wireless World Research Forum., Wiley, Chichester**, pp. 157-170.

Ruokolainen, T, Metso, J **2005**, 'Web-Pilarcos: välilojelmistopalveluita sähköisille liiketoimintaverkostoille', **Tietojenkäsittelytieteen päivät 2005, Oulun yliopisto, Oulu**, pp. 154-157.

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**2006**

Arbanowski, S, Kellerer, W, Gessler, S, Kemettinen, M, Lipka, M, Raatikainen, K **2006**, 'Service infrastructures: chapter 4', in R Tafazolli (ed.), **Technologies for the wireless future**, 1. edn, **Wiley, Chichester**, pp. 59-110.

Holi, M, Hyvönen, E **2006**, 'Modeling Uncertainty in Semantic Web Taxonomies', **Soft Computing in Ontologies and Semantic Web, Studies in Fuzziness and Soft Computing**, vol. **204**, Springer-Verlag, Berlin Heidelberg New York, pp. 31-46.

Hyvönen, E, Ruotsalo, T, Häggström, T, Salminen, M, Junnila, M, Virkkilä, M, Haaramo, MJ, Mäkelä, E, Kauppinen, T, Viljanen, K **2006**, 'CultureSampo - Finnish culture on the semantic web: the vision and first results', **New developments in artificial intelligence and the semantic web**, Finnish Artificial Intelligence Society, Helsinki, pp. 25-36.

Junnila, M, Hyvönen, E, Salminen, M **2006**, 'Describing and linking cultural semantic content by using situations and actions', **New developments in artificial intelligence and the semantic web**, Finnish Artificial Intelligence Society, Helsinki, pp. 13-24.

Kutvonen, L, Morin, J, Linington, PF (eds) **2006**, 'IS-TSPQ 1st International Workshop on Interoperability Solutions to Trust, Security, Policies and QoS for Enhanced Enterprise Systems IS-TSPQ 1st International Workshop on Interoperability Solutions to Trust, Security, Policies and QoS for Enhanced Enterprise Systems: Co-chairs message', in H Panetto, N Boudjlida (eds), **Interoperability for enterprise software and applications, proceedings of the workshops and the doctoral symposium of the second IFAC/IFIP I-ESA International Conference: EI2N, WSI, IS-TSPQ 2006.**, Wiley cop..

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Norta, A, Yangarber, R, Carlson, L 2010, 'Utility Evaluation of Tools for Collaborative Development and Maintenance of Ontologies', in **14th IEEE International Enterprise Distributed Object Computing Conference Workshops: VORTE 2010/MOST 2010**, pp. 207-214.

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Pervilä, M, Kangasharju, J 2010, 'Running Servers around Zero Degrees', in **Proceedings of the first ACM SIGCOMM workshop on Green networking**, pp. 9-14.

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### RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

#### NODES/Kangasharju

Tarkoma, S, Antikainen, M **2010**, 'Canopy: Publish/subscribe with upgraph combination', in **Proceedings - IEEE INFOCOM**, pp. 5466-5467.

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#### B1 Unrefereed journal article

##### **2005**

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Kauppinen, T, Ruotsalo, T, Salminen, MSI **2005**, 'Tietämyksen mallintaminen semanttisessa webissä', **Systeemityö : Systeemityöyhdistys Sytyke ry:n jäsenlehti**, no. 4, pp. 32-34.

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##### **2006**

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##### **2008**

Ruotsalo, T, Seppälä, K, Viljanen, K, Mäkelä, E, Kurki, J, Alm, O, Kauppinen, T, Tuominen, J, Frosterus, M, Sinkkilä, R, Hyvönen, E **2008**, 'Ontology-based approach for interoperability of digital collections', **Signum**, vol 41, no. 5, 10 s.

##### **2009**

Palonen, T, Hyvönen, J, Takala, J, Hyvönen, E **2009**, 'Semanttinen Kalevala - Kulttuurisammon taontaa', **Elore**, vol 16, no. 2.

#### B2 Contribution to book/other compilations (non-refereed)

##### **2005**

Alanko, T **2005**, 'The prolog: AHTO', in K Raatikainen (ed.), **The first ten years of the Nodes Group, Series of publications / Department of Computer Science. B, Report, no. 1/2005, University of Helsinki, Helsinki**, pp. 7-12.

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### RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

#### NODES/Kangasharju

Raatikainen, K 2005, 'Our first steps in European co-operation', in K Raatikainen (ed.), **The first ten years of the Nodes Group, Series of publications / Department of Computer Science. B, Report, no. 1/2005, University of Helsinki, Helsinki**, pp. 63-65.

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##### **2005**

Hyvönen, E, Valo, A, Seppälä, K, Kauppinen, T, Komulainen, V, Ruotsalo, T, Salminen, MSI, Ylisalmi, A 2005, 'Creating a National Content and Service Infrastructure for the Semantic Web', in **Proceedings of the 4th International Semantic Web Conference**.

Kauppinen, T, Hyvönen, E 2005, 'Modeling Coverage Between Geospatial Resources', in **Posters and Demos at the 2nd European Semantic Web Conference ESWC2005**, pp. 49-50.

Mäkelä, E, Hyvönen, E, Sidoroff, T 2005, 'View-Based User Interfaces for Information Retrieval on the Semantic Web', in **Proceedings of the ISWC-2005 Workshop: End User Semantic Web Interaction**.

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Sidoroff, T, Hyvönen, E 2005, 'Semantic E-government Portals - A Case Study', in **Proceedings of the ISWC-2005 Workshop Semantic Web Case Studies and Best Practices for eBusiness SWCASE05**.

##### **2006**

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#### NODES/Kangasharju

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#### **2008**

Hyvönen, E, Mäkelä, E, Ruotsalo, T, Kauppinen, T, Alm, O, Kurki, J, Takala, J, Puputti, K, Kuitinen, H **2008**, 'CultureSampo-Finnish Culture on the Semantic Web', in **Posters of the 5th European Semantic Web Conference 2008 (ESWC 2008)**.

Tuominen, J, Frosterus, M, Viljanen, KEA, Hyvönen, E **2008**, *ONKI-SKOS - Publishing and Utilizing Thesauri in the Semantic Web*,.

#### **2009**

Lenzen, C, Suomela, J, Wattenhofer, R **2009**, 'Local algorithms: Self-stabilization on speed', in **Stabilization, Safety, and Security of Distributed Systems: 11th International Symposium, SSS 2009. Lyon, France, November 3–6, 2009. Proceedings**, pp. 17-34 **Lecture Notes in Computer Science**, vol. 5873.

#### **2010**

Hyvönen, E, Palonen, T, Takala, J **2010**, 'Global Access to Distributed Ontology Repositories Narrative Semantic Web -- Case National Finnish Epic Kalevala', in **Poster Papers, the Extended Semantic Web Conference ESWC 2010**.

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Suominen, O, Hyvönen, E **2010**, 'Expressing and Aggregating Rich Event Descriptions', in **Proceedings of the 6th Workshop on Scripting and Development on the Semantic Web**.

#### C1 Published scientific monograph

#### **2005**

Kutvonen, L, Karjalainen, S, Ritola, A, Ruohomaa, S, Hämäläinen, M, Nurmela, T, Ruokolainen, T, Virtanen, T **2005**, *Virtual organizations*, **Department of Computer Science Series of Publications C**, vol. C-2005-16, vol. C-2005-16, **Helsingin yliopisto, tietojenkäsittelytieteen laitos, Hki**.

Manner, J, Fu, X **2005**, *Analysis of Existing Quality-of-Service Signaling Protocols* **Internet Engineering Task Force, Request for comments**, no. 4094, **Internet Society, Reston (VA)**.

Nurmi, P **2005**, *Bayesian game theory in practice: a framework for online reputation systems*, **Helsingin yliopisto, tietojenkäsittelytieteen laitos, Helsinki**.

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#### **2010**

Hassinen, MK, Immonen, O, Karvonen, K, Nurmi, PT, Ruohomaa, SS **2010**, *Trustworthy widget sharing*, **HIIT technical reports**, no. 2010-3, vol. 2010-3, **Helsinki Institute for Information Technology HIIT, Helsinki**.

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Tarkoma, S **2010**, *Overlay Networks: Toward Information Networking*, vol. 2010, 1 edn, **CRC Press, Taylor & Francis Group** .



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RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

NODES/Kangasharju

**C2 Edited book, compilation, conference proceeding or special issue of journal**

**2005**

Alanko, T, Bogoyavlenskiy, YA (eds) **2005**, *Modernin informaatioteknologian menetelmätutkimusta: STKV 2003 konferenssijulkaisu = Advances in methods of modern information technology : proceedings of FDPW 2003*, **Petroskoin yliopisto, Petroskoi**.

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Kutvonen, L, Lillehagen, F, Zelm, M (eds) **2005**, *Proceedings of the 2nd InterOP workshop; Enschede, The Netherlands, September 19, 2005: in conjunction with the 9th International Enterprise computing conference, 19-23 September, 2005*, **Series of publications / Department of Computer ScienceB, no. 2005-5, Helsingin yliopisto, tietojenkäsittelytieteen laitos, Helsinki**.

Miranda, H, Leggio, S, Rodrigues, L, Raatikainen, K (eds) **2005**, *A Stateless Neighbor-Aware Cooperative Caching Protocol for Ad-Hoc Networks*, **Helsingin yliopisto, tietojenkäsittelytieteen laitos, Helsinki**.

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Alanko, T, Bogoyavlenskiy, YA (eds) **2006**, *Proceedings of FDPW'2005: advances in methods of modern information technology*, vol. Vol. 7, **Petroskoin yliopisto, Petroskoi**.

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**2007**

Alanko, T, Bogoyavlenskiy, YA (eds) **2007**, *Proceedings of AMICT'2006: advances in methods of information and communication technology*, vol. Vol. 8, **Petroskoin yliopisto, Petroskoi**.

Goedicke, M, Iacob, M, Jonkers, H, Kabilan, V, Köllmann, C, Koutrouli, E, Kutvonen, L, Linington, P, Morin, J, Pawlak, M, Rifaut, A, Ruohomaa, S (eds) **2007**, *Report on the horizontal issues and task group final report M36 including subtask research results following the five task group topics : Deliverable DTG7.2*, **[bryssel]**.

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Åhlfeldt, R, Goedicke, M, Iacob, M, Jonkers, H, Kabilan, V, Köllmann, C, Koutrouli, E, Kutvonen, L, Linington, P, Morin, J, Pawlak, M, Rifaut, A, Ruohomaa, S (eds) **2007**, *Research into non-functional aspects of interoperability" : Deliverable DTG7.3*, **[bryssel]**.

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Kangasharju, J, Bogoyavlenskiy, YA (eds) **2008**, *Proceedings of AMICT'2007: advances in methods of information and communication technology*, vol. Vol. 9, **Petroskoin yliopisto, Petroskoi**.

van Sinderen, M, Johnson, P, Kutvonen, L (eds) **2008**, *Workshop on Enterprise Interoperability (IWEI 2008), September 18, 2008, Munich, Germany: proceedings*, **CTIT workshop proceedings series, no. WP08-05, CTIT, 260**.

**2009**

Aroyo, L, Hyvönen, E (eds) **2009**, *The semantic web: research and applications : 6th European Semantic Web Conference, ESWC 2009, Heraklion, Crete, Greece, May 31-June 4, 2009 : proceedings / Lora Aroyo ... [et al.] (eds.)*, **LNCS sublibrarySL 3, no. 5554, Springer-Verlag, Berlin**.



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#### NODES/Kangasharju

Hardman, L (ed.), Aroyo, L (ed.), Ossenbruck, J (ed.), Hyvönen, E **2009**, *Artificial Intelligence and Cultural Heritage: [special issue of IEEE Intelligent Systems]*,.

Kangasharju, J, Bogoyavlenskiy, YA (eds) **2009**, *Proceedings of AMICT2008: advances in methods of information and communication technology*, vol. Vol. 10, **Petroskoin yliopisto, Petroskoi**.

#### **2010**

Floréen, P, Krüger, A, Spasojevic, M (eds) **2010**, *Pervasive computing: 8th International Conference, Pervasive 2010 Helsinki, Finland, May 17-20, 2010 Proceedings*, **Lecture Notes in Computer Science**, no. **6030**, vol. **2010**, **Heidelberg, Berlin, Springer Verlag**,.

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Guizzardi, G, Kutvonen, L, Almeida, JPA (eds) **2010**, *2010 14th IEEE International EDOC enterprise computing conference workshops: Proceedings*, **IEEE Computer Society, Los Alamitos, CA**.

#### D1 Article in professional journal

#### **2010**

Hyvönen, E **2010**, 'Linked Open Data - innovaatio jaetulle avoimelle tiedolle', **Tietoasiantuntija**, vol 25, no. 2-3.

Suomela, J **2010**, 'Paikallinen laskettavuus', **Tietojenkäsittelytiede**, vol 31, pp. 57-69.

Tarkoma, S **2010**, 'Sisältöpohjaiset verkot ja palvelut', **Tieteessä tapahtuu**, vol 28, no. 2, pp. 9-11.

#### D2 Article in professional hand or guide book or in a professional data system, or text book material

#### **2006**

Kutvonen, L, Berre, A, Hahn, A, Akehurst, D, Bezevin, J, Tsalgatidou, A, Vermaut, F, Lington, PF **2006**, 'State of the art for interoperability architecture approaches', **Model driven and dynamic, federated enterprise interoperability architecture for nonfunctional aspects. Deliverable D9.1 of INTEROP NoE IST-508 011**,.

Kutvonen, L **2006**, 'Web-Pilarcos: Production and Integration of Application Systems with Web Technologies', **ELO - Elektronisen liiketoiminnan logistiikka 2002-2005, Teknologiaohjelmaraaportti**, no. **7/2006**, **Tekes**, pp. 6-99.

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#### D4 Published development or research report

#### **2010**

Floréen, P, Noronen, V (eds) **2010**, *Helsinki Institute for Information Technology HIIT Annual Report 2009*, **HIIT Publications**, vol. 2010, 1 edn, **HIIT, Espoo**.

#### E1 Popular article, newspaper article

#### **2005**

Flóreen, P, Linden, G **2005**, 'Vet din telefon vad du gör och vad du vill?', **Universitas Helsingiensis : a quarterly**, vol 24, no. 3, pp. 17-19.

#### **2008**

Hyvönen, E, Kettula, S **2008**, 'Kulttuurisampo', **Museo : Suomen museoliiton julkaisu**, vol 2008, no. 4, pp. 14-16.

Ojala, T, Riekk, J, Kukka, H, Leskelä, M, Tarkoma, S **2008**, 'Ubiikkia prototyyppeä kaupunkiin', **Proessori**, no. 11.

#### I2 ICT programs or applications

#### **2008**

*GenealogyJ: A viewer and editor for genealogic data*



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NODES/Kangasharju

**2009**

*Nmap3Nagios toolkit*

*Freeciv: An empire-building strategy game*

*Widelands: A realtime strategy game*



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## RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

NODES/Kangasharju

### 1 Analysis of activities 2005-2010

- Associated person is one of Patrik Florén , Giulio Jacucci , Jussi Kangasharju ,  
Markku P I Kojo , Lea Kutvonen , Sasu Tarkoma , Timo Alanko ,  
Eero Hyvönen , Jukka Manner , Kimmo Raatikainen, Timo Karvi ,  
Eve Hoggan , Alexander Norta , Petteri Tapio Nurmi , Jukka  
Suomela , Laila Daniel , Jaakko Juhani Kangasharju, Tomi Kauppinen, Jouni Korhonen, Simone Leggio, Oriana  
Riva, Pasi Sarolahti, Sourav Bhattacharya , Yi Ding , Markus Holi, Ossi Karkulahti ,  
Johannes Korpela , Emil Lagerspetz , Mikko Pervilä , Sini Ruohomaa ,  
Toni Ruokolainen , Yiyun Shen , Samu Varjonen ,

Activity type	Count
Supervisor or co-supervisor of doctoral thesis	31
Prizes and awards	9
Editor of research journal	4
Editor of research anthology/collection/conference proceedings	8
Peer review of manuscripts	206
Assessment of candidates for academic posts	10
Membership or other role in review committee	6
Membership or other role in research network	6
Membership or other role in national/international committee, council, board	30
Membership or other role in public Finnish or international organization	15
Membership or other role of body in private company/organisation	2
Other tasks of an expert in private sector	3
Participation in interview for written media	3
Participation in radio programme	2
Participation in TV programme	5
Participation in interview for web based media	1





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## 2 Listing of activities 2005-2010

### Supervisor or co-supervisor of doctoral thesis

#### **Patrik Floréen ,**

PhD supervision: Jukka Suomela (completed), Patrik Floréen, 2005 → 13.06.2009, Finland

PhD supervision: Michael Przybiski, Patrik Floréen, 01.2005 → ..., Finland

PhD supervision: Petteri Nurmi (completed), Patrik Floréen, 2006 → 24.10.2009, Finland

PhD supervision: Sourav Bhattacharya, Patrik Floréen, 12.2009 → ..., Finland

PhD supervision: Taneli Vähäkangas, Patrik Floréen, 01.2010 → ..., Finland

#### **Jussi Kangasharju ,**

Supervisor of dissertation of Mikko Pervilä, Jussi Kangasharju, 08.2008 → 2013, Finland

Supervisor, referee for doctoral dissertation, and member of committee, Jussi Kangasharju, 2008, Germany

Supervisor of dissertation of Liang Wang, Jussi Kangasharju, 12.2010 → 2014, Finland

Supervisor of dissertation of Ossi Karkulahti, Jussi Kangasharju, 01.2010 → 2014, Finland

Supervisor, referee of doctoral dissertation, and member of committee, Jussi Kangasharju, 2010, Germany

#### **Markku P I Kojo ,**

PhD supervisor of Laila Daniel, Markku P I Kojo, 2006 → 2010, Finland

PhD supervisor of Davide Astuti, Markku P I Kojo, 06.2010 → ..., Finland

PhD supervisor of Yi Ding, Markku P I Kojo, 06.2010 → ..., Finland

#### **Lea Kutvonen ,**

PhD Supervisor of Lea Viljanen, Lea Kutvonen, 1998 → ..., Finland

PhD Supervisor of Janne Metso, Lea Kutvonen, 2006 → ..., Finland

Supervision of PhD thesis of Sini Ruohomaa, Lea Kutvonen, 2006 → 2011, Finland

Supervision of PhD thesis of Petteri Pöyhönen, Lea Kutvonen, 2008 → 2011, Finland

Supervision of PhD thesis of Suresh Chande, Lea Kutvonen, 2008 → 2011, Finland

Supervision of PhD thesis of Markus Miettinen, Lea Kutvonen, 2009 → ..., Finland

Supervision of PhD thesis of Toni Ruokolainen, Lea Kutvonen, 2009 → 2011, Finland

Supervision of PhD thesis of Tuomas Nurmela, Lea Kutvonen, 2009 → ..., Finland

Supervision of PhD thesis of Yiyun Shen, Lea Kutvonen, 2010 → ..., Finland

#### **Sasu Tarkoma ,**

XML-aware Data Synchronization for Mobile Devices, Sasu Tarkoma, 11.12.2009, Finland

SECURING THE INTERNET WITH DIGITAL SIGNATURES, Sasu Tarkoma, 10.12.2010, Finland

#### **Kimmo Raatikainen**

PhD Supervisor of Jouni Korhonen, Kimmo Raatikainen, 1999 → 2008, Finland

PhD Supervisor of Pasi Sarolahti, Kimmo Raatikainen, 2001 → 2007, Finland

PhD Supervisor of Sasu Tarkoma, Kimmo Raatikainen, 2001 → 2006, Finland

PhD Supervisor of Simone Leggio, Kimmo Raatikainen, 2002 → 2007, Finland

PhD Supervisor of Jaakko Kangasharju, Kimmo Raatikainen, 2003 → 2008, Finland

PhD Supervisor of Oriana Riva, Kimmo Raatikainen, 2003 → 2007, Finland

#### **Timo Karvi ,**

PhD Supervisor of Harri Forsgren, Timo Karvi, 2004 → ..., Finland



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### RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

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#### **Prizes and awards**

##### **Markku P I Kojo ,**

Best Paper Award at ICN2008, Markku P I Kojo, 2008

##### **Lea Kutvonen ,**

Best paper award at EDOC2006, Lea Kutvonen, 2006

##### **Sasu Tarkoma ,**

The best textbook of 2009 prize, Sasu Tarkoma, 10.02.2009, Finland

##### **Eemil Lagerspetz ,**

Best Demo Award, MDM 2010, Eemil Lagerspetz, 27.05.2010, United States

Best Poster Award, MDM 2010, Eemil Lagerspetz, 27.05.2010, United States

##### **Mikko Pervilä ,**

Pro gradu -palkinto, Mikko Pervilä, 19.11.2009, Finland

Hyvä Tutkija-palkinto, Mikko Pervilä, 17.12.2010, Finland

##### **Sini Ruohomaa ,**

Best paper award: EDOC 2006, Sini Ruohomaa, 20.10.2006, China

Google Anita Borg Scholarship 2007, Sini Ruohomaa, 16.05.2007

#### **Editor of research journal**

##### **Jussi Kangasharju ,**

Computer Communications, Jussi Kangasharju, 2010 → ...

##### **Eero Hyvönen ,**

International Journal of Metadata, Semantics and Ontologies (IJMSO), Eero Hyvönen, 01.01.2006 → 31.12.2006

New Developments in Artificial Intelligence and the Semantic Web Proceedings of the 12th Finnish Artificial Intelligence Conference STeP 2006, Eero Hyvönen, 26.10.2006 → 27.10.2006, Finland

##### **Kimmo Raatikainen**

Member of the editorial staff of the International Journal on Wireless and Optical Communications, Kimmo Raatikainen, 01.2006 → 12.2006, Singapore

#### **Editor of research anthology/collection/conference proceedings**

##### **Lea Kutvonen ,**

DAIS1999, Lea Kutvonen, 1999 → ...

2nd INTEROP WS at EDOC2005, Lea Kutvonen, 2005 → ...

Proceedings of IFIP WG6.1 DAIS2005 conference, Lea Kutvonen, 2005 → ...

IS-TSPQ2006, Lea Kutvonen, 2006 → ...

Tietojenkäsittelytieteen päivät 2006, Lea Kutvonen, 2006 → ...

IS-TSPQ2007, Lea Kutvonen, 2007 → ...

IWEI2008, Lea Kutvonen, 2008 → ...

##### **Sini Ruohomaa ,**

Editor: International workshop on Interoperability solutions on Trust, Security, Policies and QoS for Enhanced Enterprise Systems (IS-TSPQ 2007), Sini Ruohomaa, 03.2007, Portugal



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##### **Peer review of manuscripts**

###### **Patrik Floréen ,**

32th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2006), Patrik Floréen, 2005, Czech Republic

First Workshop on Context Awareness for Proactive Systems (CAPS 2005), Patrik Floréen, 2005, Finland

International Journal of Neural Systems, Patrik Floréen, 11.2005

Natural Computing, Patrik Floréen, 07.2005, Netherlands

IEEE Communication Letters, Patrik Floréen, 02.2006, United States

IEEE Transactions on Neural Networks, Patrik Floréen, 02.2006, United States

Second Workshop on Context Awareness for Proactive Systems 2006, Patrik Floréen, 2006, Germany

2007 IEEE International Conference on Data Mining (ICDM 2007), Patrik Floréen, 2007

2007 International Workshop on Context Modeling and Management for Smart Environments (IWCMM 2007), Patrik Floréen, 2007, France

2nd European Conference on Smart Sensing and Context (EuroSSC2007), Patrik Floréen, 2007, United Kingdom

3rd Workshop on Context Awareness for Proactive Systems (CAPS 2007), Patrik Floréen, 2007, United Kingdom

7th IFIP International Conference on Distributed Applications and Interoperable Systems (DAIS 07), Patrik Floréen, 2007

ACM/Springer Mobile Networks and Applications (MONET), Patrik Floréen, 2007, United States

First International Conference on Ambient Media and Systems (Ambi-sys 2008), Patrik Floréen, 2007, Canada

Fourth International Conference on Innovations in Information Technology 2007 (Innovations 07), Patrik Floréen, 2007

International Journal on Artificial Intelligence Tools (IJAIT), Patrik Floréen, 2007, United States

International Workshop on Context Modeling and Management for Smart Environments (CMMSE07), Patrik Floréen, 2007, France

International Workshop on Improved Mobile User Experience IMUX 2007, Patrik Floréen, 2007, Canada

Third International Conference on Body Area Networks (BodyNets 08), Patrik Floréen, 2007, United States

2nd IEEE International Workshop on Context Modeling and Management for Smart Environments (CMMSE 08), Patrik Floréen, 2008, United Kingdom

2nd International Workshop on Improved Mobile User Experience IMUX 2008, Patrik Floréen, 2008, Australia

7th International Conference on Pervasive Computing (Pervasive 2009), Patrik Floréen, 2008, Germany

IEEE Communications Letters, Patrik Floréen, 02.2008 → 09.2008, United States

IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC2008), Patrik Floréen, 2008, Taiwan

IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2008), Patrik Floréen, 2008, France

International Workshop on Context-aware Mobile Learning (CAML'08), Patrik Floréen, 2008, France

2009 International Workshop on Technologies to Counter Cognitive Decline (TCCD), Patrik Floréen, 2009, United Kingdom

3rd IEEE International Workshop on Context Modeling and Management for Smart Environments (CMMSE09), Patrik Floréen, 2009, United States

4th European Conference on Smart Sensing and Context (EuroSSC2009), Patrik Floréen, 2009, United Kingdom

International Conference on Wireless Information Networks and Systems (WINSYS 2009), Patrik Floréen, 2009, Italy

International Workshop on Pervasive Service Computing and Applications (PSCA2009), Patrik Floréen, 2009, China

2nd International ICST Conference on Ambient Media and Systems (Ambi-Sys 2010), Patrik Floréen, 2010, United States

International Conference on Wireless Information Networks and Systems (WINSYS 2010), Patrik Floréen, 2010, Greece

Journal of Systems and Software, Patrik Floréen, 02.2010, Netherlands

###### **Jussi Kangasharju ,**

IEEE/ACM Transactions on Networking, Jussi Kangasharju, 01.01.2007 → 31.12.2007, United States

PC Member: GridNets, Jussi Kangasharju, 2007, France



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#### NODES/Kangasharju

PC Member: IEEE International Peer-to-Peer Conference, Jussi Kangasharju, 01.01.2007 → 31.12.2007, Ireland  
PC Member: IEEE International Symposium on Multimedia, Jussi Kangasharju, 01.01.2007 → 31.12.2007, Taiwan  
PC Member: WebIST, Jussi Kangasharju, 01.01.2007 → 31.12.2007, Portugal  
ACM Principles on Distributed Computation, Jussi Kangasharju, 2008  
PC Member: ACM CoNext Conference, Jussi Kangasharju, 2008  
PC Member: Communications and Networking Simulation Symposium, Jussi Kangasharju, 01.01.2008 → 31.12.2008  
PC Member: IEEE International Peer-to-Peer Conference, Jussi Kangasharju, 2008  
PC Member: International Conference on Computer Communication Networks, Jussi Kangasharju, 01.01.2008 → 31.12.2008  
PC Member: International Symposium on Multimedia, Jussi Kangasharju, 01.01.2008 → 31.12.2008  
PC Member: MobiQuitous Conference, Jussi Kangasharju, 2008  
Transactions on Parallel and Distributed Systems, Jussi Kangasharju, 01.01.2008  
PC Member: International Conference on Information Networking, Jussi Kangasharju, 2009  
PC Member: MobiQuitous Conference, Jussi Kangasharju, 2009  
PC Member: WoWMoM Conference, Jussi Kangasharju, 2009  
PC Member: IEEE International Peer-to-Peer Conference, Jussi Kangasharju, 2010  
PC Member: International Conference on Information Networking, Jussi Kangasharju, 2010  
PC Member: MobiQuitous conference, Jussi Kangasharju, 2010  
PC Member: World Wide Web Conference, Jussi Kangasharju, 2010

#### **Markku P I Kojo ,**

IEEE Communications Magazine, Markku P I Kojo, 2005  
IEEE International Symposium on Personal Indoor and Mobile Radio Communications(PIMRC '05), Markku P I Kojo, 2005  
IEEE Wireless Communications Journal, Markku P I Kojo, 2005  
PC Member: International Conference on Parallel Processing (ICPP-05), Markku P I Kojo, 2005  
IEEE International Conference on Mobile Ad-Hoc and Sensor Systems (MASS 06), Markku P I Kojo, 2006  
IEEE Journal on Selected Areas in Communications -Special issue on 'Cross-Layer Optimized Wireless Multimedia Communications', Markku P I Kojo, 2006  
PC Member: IEEE GLOBECOM'2006 - Wireless Communications and Networking Symposium, Markku P I Kojo, 2006  
Simulation: Transactions of the Society for Modeling and Simulation International, Markku P I Kojo, 2006  
Tietojenkäsittelytieteen päivät 2006, Markku P I Kojo, 2006  
Australasian Telecommunication Networks and Applications Conference 2007 (ATNAC 2007), Markku P I Kojo, 2007  
PC Member: ICC 2007 Wireless Communications Symposium, Markku P I Kojo, 2007  
15th International Conference on Telecommunications, Markku P I Kojo, 2008  
ICC 2008 Wireless Communications Symposium, Markku P I Kojo, 2008  
ICC 2008 Wireless Networking Symposium, Markku P I Kojo, 2008  
IEEE Network - Special Issue on Implications and Control of Middleboxes in the Internet, Markku P I Kojo, 2008  
PC Member: 4th International Mobile Multimedia Communications Conference (MobiMedia 2008), Markku P I Kojo, 2008, Finland  
IEEE Communications Letter, Markku P I Kojo, 2009  
PC Member: 3rd European Symposium on Mobile Media Delivery (EUMOB 2009), Markku P I Kojo, 2009  
PC Member: Eighth International Conference on Networking (ICN 2009), Markku P I Kojo, 2009  
PC Member: IEEE GLOBECOM 2009 - Wireless Networking Symposium, Markku P I Kojo, 2009  
PC Member: International Conference on Advances in Satellite and Space Communications (SPACOMM 2009), Markku P I Kojo, 2009  
Multimedia Tools and Applications Journal, Markku P I Kojo, 2010



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#### NODES/Kangasharju

PC Member: IEEE GLOBECOM 2010 - Wireless Networking Symposium, Markku P I Kojo, 2010

PC Member: International Conference on Advances in Satellite and Space Communications (SPACOMM 2010), Markku P I Kojo, 2010

PC Member: International Conference on Networking (ICN 2010), Markku P I Kojo, 2010

PC Member: International ICST Conference on Mobile and Ubiquitous Systems (MobiQuitous 2010), Markku P I Kojo, 2010

#### **Lea Kutvonen ,**

PC member of DAIS2003, Lea Kutvonen, 2003 → ...

PC member of EDOC conference series, Lea Kutvonen, 2003 → 2011

PC member of EDOC2003 (Enterprise Distributed Objects Computing), Lea Kutvonen, 2003 → ...

PC member of WODPEC (Workshop on ODP for Enterprise Computing), Lea Kutvonen, 2004 → ...

Chair of 2nd INTEROP workshop at EDOC2005 conference, Lea Kutvonen, 01.01.2005 → 31.12.2005

Chair of Tietojenkäsittelytieteen päivät 2006, Lea Kutvonen, 2005 → ..., Finland

PC Member in BPM (Business Process Management) conference, Lea Kutvonen, 2005 → 2011

PC member for BPM2005 (Business process management), Lea Kutvonen, 01.01.2005 → 31.12.2005

PC member for INTEROP-ESA2005 (First international conference on Interoperability of Enterprise software and applications), Lea Kutvonen, 01.01.2005 → 31.12.2005

PC member for WODPEC2005 (workshop on ODP for enterprise computing), Lea Kutvonen, 01.01.2005 → 31.12.2005

PC member of BPM2005, Lea Kutvonen, 2005 → ...

PC member of DAIS2005, Lea Kutvonen, 2005 → ...

PC member of EDOC2005 (Enterprise computing conference), Lea Kutvonen, 01.01.2005 → 31.12.2005

PC member of I-ESA (Interoperable Enterprise System Architecture) series, Lea Kutvonen, 2005 → 2011

PC member of UWSI2005 (ubiquitous web systems and intelligence), Lea Kutvonen, 01.01.2005 → 31.12.2005

PC member of WAR2005 (web applications and research), Lea Kutvonen, 01.01.2005 → 31.12.2005

Reviewer for 16th IFAC World Congress, Praha 2005, Lea Kutvonen, 01.01.2005 → 31.12.2005

Reviewer for International Journal of Enterprise Information Systems, Lea Kutvonen, 01.01.2005 → 31.12.2005

Reviewer on International Journal of Enterprise Information Systems, Lea Kutvonen, 2005 → ...

Reviewer on Journal of Intelligent Manufacturing (JIM), Lea Kutvonen, 01.01.2005 → 31.12.2005

Tietojenkäsittelytieteen päivät 2005, Lea Kutvonen, 01.01.2005 → 31.12.2005

publicity chair for EDOC2005 conference (IEEE), Lea Kutvonen, 01.01.2005 → 31.12.2005

Chair for International Workshop on Interoperability Solutions to Trust, Security, Policies and QoS for Enhanced Enterprise Systems (IS-TSPQ2006), Lea Kutvonen, 01.01.2006 → 31.12.2006

Chair of IS-TSPQ2007 (Interoperability solutions on trust, security, policy and QoS for Enterprise systems), Lea Kutvonen, 2006 → ...

Chair of IS-TSPQ2006 (Interoperability solutions on trust, security, policy and QoS for Enterprise systems), Lea Kutvonen, 2006 → ...

Chair of Tietojenkäsittelytieteen päivät 2006, Lea Kutvonen, 2006 → ...

IEEE Transactions on Systems, Man, and Cybernetics--Part C: Applications and Reviews, Lea Kutvonen, 01.01.2006 → 31.12.2006

PC member for Interoperability for Enterprise Software and Applications Conference I-ESA'06, Lea Kutvonen, 20.03.2006 → 25.03.2006, France

PC member of IFIP WG6.1 DAIS 2006 conference, Lea Kutvonen, 2006 → ...

PC member of Second International Workshop on the Value of Security through Collaboration (SECOVAL 2006), Lea Kutvonen, 01.01.2006 → 31.12.2006

PC member of The Tenth IEEE International EDOC Conference (EDOC 2006) "The Enterprise Computing Conference", Lea Kutvonen, 01.01.2006 → 31.12.2006, Hong Kong

Reviewer for IEEE Information Systems Frontiers, Lea Kutvonen, 01.01.2006 → 31.12.2006

Reviewer on Information systems frontier, Lea Kutvonen, 2006 → ...



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Tietojenkäsittelytieteen päivät 2006, Lea Kutvonen, 01.01.2006 → 31.12.2006

Chair of The 2nd international workshop on Interoperability solutions to Trust, Security, Policies and QoS for Enhanced Enterprise Systems, Lea Kutvonen, 2007

PC member of DAIS2007, Lea Kutvonen, 2007 → ...

PC member of EDOC2007 (Enterprise computing conference EDOC), Lea Kutvonen, 01.01.2007 → 31.12.2007

PC member of IASTED International Conference on Parallel and Distributed Computing and Networks, Lea Kutvonen, 01.01.2007 → 31.12.2007, Austria

PC member of ICDDT 2007, Lea Kutvonen, 01.01.2007 → 31.12.2007, United States

PC member of IEEE SECURECOMM SECOVAL'07 Third International Workshop on the Value of Security through Collaboration (SECOVAL 2007), Lea Kutvonen, 01.01.2007 → 31.12.2007

PC member of WODPEC2007(workshop on ODP for enterprise computing), Lea Kutvonen, 01.01.2007 → 31.12.2007

Reviewer for Information Systems Frontiers (ISF) - Special Issue on Enterprise Services Computing: Evolution and Challenges, Lea Kutvonen, 01.01.2007 → 31.12.2007

Reviewer for International Journal of Enterprise Information Systems, Special issue on Interoperability of Enterprise Systems and Applications, Lea Kutvonen, 01.01.2007 → 31.12.2007

Reviewer on Transactions on Systems, Manufacturing and Cybernetics, IEEE Journal, Lea Kutvonen, 2007 → ...

SECUREWARE2007, Lea Kutvonen, 01.01.2007 → 31.12.2007

steering committee member for IFIP WG6.1 DAIS2007 conference, Lea Kutvonen, 2007 → ...

Co-chair of 1st International IFIP WG5.8 workshop of Enterprise Interoperability (IWEI08), Lea Kutvonen, 2008 → ...

PC member of IFIP WG6.1 DAIS conference, Lea Kutvonen, 2008 → ...

PC member of EDOC2008, Lea Kutvonen, 2008 → ...

PC member of IWEI, Lea Kutvonen, 2008 → 2011

PC member of WODPEC2008, Lea Kutvonen, 2008 → ...

Reviewer on International Journal of Electronic Commerce, Lea Kutvonen, 2008 → ...

Reviewer on Software: Practice and Experience, Lea Kutvonen, 2008 → ...

Track chair on Business/Enterprise Architecture for ICEC08 (International conference on Electronic commerce), Lea Kutvonen, 2008 → ...

steering committee member for IFIP WG6.1 DAIS 2008 conference, Lea Kutvonen, 2008 → ...

PC member for IFIP WG6.1 DAIS 2009 conference, Lea Kutvonen, 2009 → ...

PC member of BPM2009, Lea Kutvonen, 2009 → ...

PC member of ECOWS, Lea Kutvonen, 2009 → ...

PC member of EDOC2009, Lea Kutvonen, 2009 → ...

PC member of IEEE CEC, Lea Kutvonen, 2009 → ...

PC member of IEEE CEC 2009, Lea Kutvonen, 2009 → ...

PC member of SOC-LOG ( International Workshop on Service Oriented Computing in Logistics), Lea Kutvonen, 2009 → ...

PC member of SOC-LOG2009, Lea Kutvonen, 2009 → ...

PC member of SOCE2009, Lea Kutvonen, 2009 → ...

PC member of WODPEC2009, Lea Kutvonen, 2009 → ...

steering committee member for IFIP WG6.1 DAIS conference, Lea Kutvonen, 2009 → ...

IEEE Services conference 2010, Lea Kutvonen, 2010 → ...

PC Chair of EDOC2010, Lea Kutvonen, 2010 → ...

PC member for IFIP WG6.1 DAIS 2010 conference, Lea Kutvonen, 2010 → ...

PC member of CEC-PAW2010, Lea Kutvonen, 2010 → ...

PC member of WODPEC2010, Lea Kutvonen, 2010 → ...



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#### NODES/Kangasharju

##### **Sasu Tarkoma ,**

ADPUC'06 (Advanced Data Processing in Ubiquitous Computing), Sasu Tarkoma, 20.07.2006 → 10.09.2006, Australia

Elsevier Journal of Systems and Software manuscript reviewing, Sasu Tarkoma, 2006 → 2011

IEEE DEBS 2006, Sasu Tarkoma, 23.01.2006 → 21.02.2006, Portugal

Nordic Journal of Computer Science Manuscript reviewing, Sasu Tarkoma, 2006

Reviewer for Computer Networks Journal, Sasu Tarkoma, 2006 → 2010

The Computer Journal manuscript reviewing, Sasu Tarkoma, 2006, United Kingdom

2nd International Workshop on Advanced Data Processing in Ubiquitous Computing, Sasu Tarkoma, 03.09.2007 → 15.09.2007, United States

First International Workshop on Telecom Service Oriented Architectures (TSOA-07), Sasu Tarkoma, 01.04.2007 → 01.06.2007, Austria

IEEE PIMRC 2007, Sasu Tarkoma, 03.03.2007 → 31.05.2007, Greece

IEEE ICT 2008, Sasu Tarkoma, 01.03.2008 → 30.05.2008, Russia

Programme Committee Member: Second ACM International Conference on Distributed Event-based Systems (DEBS 2008), Sasu Tarkoma, 01.07.2008 → 04.07.2008

FutureNet II 2009, Sasu Tarkoma, 03.07.2009 → 17.08.2009, United States

IWCMC 2009 Mobile P2P Workshop , Sasu Tarkoma, 01.03.2009 → 30.04.2009, Germany

International Workshop on Security, Privacy and Authentication in Wireless Networks (SPAWN), Sasu Tarkoma, 20.02.2009 → 28.02.2009, Greece

Pervasive Service Computing and Applications (PSCA 2009), Sasu Tarkoma, 30.07.2009 → 12.08.2009, China

Programme Committee Member: Third ACM International Conference on Distributed Event-based Systems (DEBS 2009), Sasu Tarkoma, 06.07.2009 → 09.07.2009

Springer MONET Journal manuscript reviewing, Sasu Tarkoma, 2009

Programme Committee Member: Fourth ACM International Conference on Distributed Event-based Systems (DEBS 2010), Sasu Tarkoma, 12.07.2010 → 15.07.2010

Programme Committee Member: 6th International Conference on Grid and Pervasive Computing (GPC 2011), Sasu Tarkoma, 11.05.2010 → 13.05.2010

Programme Committee Member: DEBS 2010 PhD Workshop, Sasu Tarkoma, 11.07.2010

##### **Kimmo Raatikainen**

Referee of 6th IEEE Workshop on Applications and Services in Wireless Networks (ASWN 2006), Kimmo Raatikainen, 29.05.2006 → 31.05.2006, Germany

Referee of IEEE 2nd International Conference on Wireless Internet (WICON 2006), Kimmo Raatikainen, 01.2006 → 08.2006, United States

Referee of Mobility Conference 2006, Kimmo Raatikainen, 25.10.2006 → 27.10.2006, Thailand

Referee of Networking 2006, Kimmo Raatikainen, 15.05.2006 → 19.05.2006, Portugal

Referee of PIMRC 2006 - the 17th Annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, Kimmo Raatikainen, 11.09.2006 → 14.09.2006, Finland

##### **Jukka Suomela ,**

SDM – SIAM International Conference on Data Mining 2007: reviewer, Jukka Suomela, 2006, United States

Discrete Applied Mathematics: reviewer, Jukka Suomela, 2007 → 2008

Information Processing Letters: reviewer, Jukka Suomela, 2007

Journal of Universal Computer Science: reviewer, Jukka Suomela, 2007

Computational Geometry – Theory and Applications: reviewer, Jukka Suomela, 2008

ICT – International Conference on Telecommunications 2008: reviewer, Jukka Suomela, 2008, Russia

Journal of Systems and Software: reviewer, Jukka Suomela, 2008

Pervasive – International Conference on Pervasive Computing 2009: reviewer, Jukka Suomela, 2008, Japan



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#### NODES/Kangasharju

SWAT – Scandinavian Workshop on Algorithm Theory 2008: reviewer, Jukka Suomela, 2008, Sweden

Sensors: reviewer, Jukka Suomela, 2008

DCOSS – International Conference on Distributed Computing in Sensor Systems 2009: reviewer, Jukka Suomela, 2009, United States

ESA – Annual European Symposium on Algorithms 2009: reviewer, Jukka Suomela, 2009, Denmark

Journal of Computational Geometry: reviewer, Jukka Suomela, 2009

SODA – ACM-SIAM Symposium on Discrete Algorithms 2010: reviewer, Jukka Suomela, 2009, United States

Algorithmica: reviewer, Jukka Suomela, 2010

ESA – Annual European Symposium on Algorithms 2010: reviewer, Jukka Suomela, 2010, United Kingdom

SOFSEM – International Conference on Current Trends in Theory and Practice of Computer Science 2011: reviewer, Jukka Suomela, 2010, Slovakia

SPAA – ACM Symposium on Parallelism in Algorithms and Architectures 2010: reviewer, Jukka Suomela, 2010, Greece

#### **Yi Ding ,**

GLOBECOM 2010 Conference Paper Review, Yi Ding, 30.04.2010 → 11.05.2010

#### **Mikko Pervilä ,**

CCNC '10 Research Student Workshop, Mikko Pervilä, 09.01.2010, United States

MONAMI 2010, Mikko Pervilä, 22.09.2010 → 24.09.2010, Spain

#### **Sini Ruohomaa ,**

Reviewer: IFIP International Conference on Distributed Applications and Interoperable Systems (DAIS 2005), Sini Ruohomaa, 2005, Greece

PC member: International workshop on Interoperability solutions on Trust, Security, Policies and QoS for Enhanced Enterprise Systems (IS-TSPQ 2007), Sini Ruohomaa, 03.2007, Portugal

PC member: International Workshop on the Value of Security Through Collaboration (SECOVAL 2006), Sini Ruohomaa, 06.2007, United States

PC member: International Workshop on the Value of Security Through Collaboration (SECOVAL 2007), Sini Ruohomaa, 06.2007, France

PC member: International Conference on Social Informatics (SocInfo 2010), Sini Ruohomaa, 27.10.2010 → 29.10.2010, Austria

Reviewer: IEEE International EDOC conference (EDOC 2010), Sini Ruohomaa, 25.10.2010 → 29.10.2010, Brazil

#### **Toni Ruokolainen ,**

PC Member: The First International Workshop on Service-Oriented Computing in Logistics, Toni Ruokolainen, 09.11.2009

PC Member: 2nd International Workshop on Service Oriented Computing in Logistics, Toni Ruokolainen, 07.12.2010

Reviewer: The 14th IEEE International Enterprise Distributed Object Computing Conference (EDOC), Toni Ruokolainen, 31.05.2010

### Assessment of candidates for academic posts

#### **Patrik Floréen ,**

Evaluation for appointment to Associate Professor in Chile, Patrik Floréen, 08.2008, Chile

Evaluation for appointment to Adjunct Professor (Docent), Patrik Floréen, 11.2009, Finland

#### **Jussi Kangasharju ,**

Evaluator for Assistant Professorship in Peer-to-Peer Networks (Juniorprofessor), Jussi Kangasharju, 2008, Germany

#### **Lea Kutvonen ,**

Committee member in filling professorship, Lea Kutvonen, 2002 → ..., Finland

Assesment of docentship candidate, Lea Kutvonen, 2006 → ..., Finland

Assesment of docentship candidates, Lea Kutvonen, 2007 → ..., Finland

Assesment of docentship candidates, Lea Kutvonen, 2007 → ..., Finland

Reviewer of student candidates, Lea Kutvonen, 2008 → ..., Finland





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#### NODES/Kangasharju

Assessment of candidates for senior lecturer position, Lea Kutvonen, 2010 → ...

##### **Kimmo Raatikainen**

Assessment of candidates for Professor post in Åbo Academi, Kimmo Raatikainen, 09.2006, Finland

#### **Membership or other role in review committee**

##### **Patrik Floréen ,**

Evaluation of applications in EU Framework Programme 6, Patrik Floréen, 04.2005, Belgium

EU Project Review, Patrik Floréen, 04.2009, Belgium

Project reviewer for the Czech Science Foundation, Patrik Floréen, 08.2009, Czech Republic

EU Project Review, Patrik Floréen, 03.2010, Belgium

##### **Sasu Tarkoma ,**

Research proposal evaluation for ANR, Sasu Tarkoma, 01.05.2010 → 06.05.2010, France

The 1st International Open Ubiquitous City Challenge, Sasu Tarkoma, 01.12.2010 → 30.09.2011, Finland

#### **Membership or other role in research network**

##### **Lea Kutvonen ,**

INTEROP NoE, Lea Kutvonen, 2004 → 2008

Member in SOCOLNET, Lea Kutvonen, 2006 → 2011

Founding member in FiFear, Lea Kutvonen, 2007 → 2011

MINEMA, Lea Kutvonen, 2007 → 2008

Member of NESSI (European Technology Platform on Software and Services - The Networked European Software and Services Initiative ), Lea Kutvonen, 2007 → 2011

INTEROP VLAB, Lea Kutvonen, 2009 → 2011

#### **Membership or other role in national/international committee, council, board**

##### **Patrik Floréen ,**

Evaluator for Integrated Project applications in the EU FP6 IST priority strategic objective Cognitive Systems, Patrik Floréen, 01.01.2005 → 31.12.2005

Member of the Board of HIIT, Patrik Floréen, 01.01.2007 → 31.12.2008, Finland

Member of the Board of Helsinki Graduate School in Computer Science and Engineering (HeCSE), Patrik Floréen, 2007 → ..., Finland

Secretary at seminar for planning the Academy of Finland's MOTIVE programme, Patrik Floréen, 06.06.2007, Finland

Deputy Member of the Board of HIIT, Patrik Floréen, 01.01.2009 → 14.11.2010, Finland

Member of the Board of Future Internet Graduate School (FIGS), Patrik Floréen, 2009 → ..., Finland

##### **Markku P I Kojo ,**

ISOC Finland Board Member, Markku P I Kojo, 2008 → ..., Finland

##### **Lea Kutvonen ,**

Member of Finnish society of Computer Science, Lea Kutvonen, 1989 → 2011

Expert member and/or national body representative in ISO/ITU-T, Lea Kutvonen, 1994 → 2007

Finnish expert representative in ISO/IEC JTC1/SC7 for RM-ODP standards, Lea Kutvonen, 1999 → 2011

ISO/IEC JTC1/SC7 on RM-ODP Finnish followup group chair, Lea Kutvonen, 1999 → 2011, Finland

Chair of Tietojenkäsittelytieteen seura / Finnish society of Computer Science, Lea Kutvonen, 01.01.2004 → 2006, Finland

IEEE and IEEE Computer society member, Lea Kutvonen, 01.01.2004 → 2011

IFIP WG6.1 Member, Lea Kutvonen, 2004 → 2011

Member of ACM, Lea Kutvonen, 01.01.2004 → ...



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#### NODES/Kangasharju

PC chair of DAIS2005 (Distributed Applications and Interoperable Systems), Lea Kutvonen, 2004 → 2005

IFIP WG6.1 DAIS conference steering committee member, Lea Kutvonen, 2005 → 2011

Member of HECSE graduate school, Lea Kutvonen, 2005 → 2011, Finland

Steering committee member of DAIS2005 (Distributed Applications and Interoperable Systems), Lea Kutvonen, 2005 → 2011

Tietojenkäsittelytieteen seura, Lea Kutvonen, 01.01.2005 → 31.12.2005

"ISO/IEC JTC1/SC7/WG19 - International Site - Techniques for Specifying IT Systems" for Open distributed Processing reference model amendments (ODP-RM), Lea Kutvonen, 01.01.2007 → 31.12.2007

IFIP WG5.8 secretary and founding member, Lea Kutvonen, 2007 → 2011

SCIFest-tapahtuman neuvottelukunta (Tietojenkäsittelytieteen seura ry:n kautta), Lea Kutvonen, 01.01.2007 → 31.12.2007, Finland

Secretary for development of the strategic research agenda on Flexible services for the Finnish centre of excellence on ICT, Lea Kutvonen, 2007, Finland

Expert member of ISO IEC/JTC1/SC38 Study groups on SOA, Cloud computing, Grids, Web services, Lea Kutvonen, 2010 → ...

#### **Sasu Tarkoma ,**

Future Internet Graduate School (FIGS), Sasu Tarkoma, 01.09.2009 → 01.09.2013, Finland

HeCSE Graduate School, Sasu Tarkoma, 01.09.2009 → 01.09.2013, Finland

COST ICT Domain Committee member, Sasu Tarkoma, 01.01.2010 → 31.12.2014, Finland

#### **Eero Hyvönen ,**

TEKES Fenix-ohjelma, Eero Hyvönen, 01.01.2006 → 31.12.2006, Finland

#### **Toni Ruokolainen ,**

Standardization body member, Toni Ruokolainen, 01.10.2010 → ..., Finland

### **Membership or other role in public Finnish or international organization**

#### **Patrik Floréen ,**

Member of Tutkijoiden ja kansanedustajien seura TUTKAS, Patrik Floréen, 2007 → ..., Finland

#### **Jussi Kangasharju ,**

Suomen Akatemia, hakemusten arvioija, Jussi Kangasharju, 01.01.2008 → 31.12.2008

#### **Markku P I Kojo ,**

Contributor to IETF, Markku P I Kojo, 1998 → ..., Finland

Internet Society, Markku P I Kojo, 01.01.2005 → ..., Finland

IANA Expert, Markku P I Kojo, 2008 → ...

#### **Lea Kutvonen ,**

Steering committee member at Department of Computer Science (cat: professors), Lea Kutvonen, 2004 → 2006

Member of DIMES ry, Lea Kutvonen, 2005 → 2009

Leading professor for Distributed systems and data communication specialization line, Lea Kutvonen, 2006 → 2010, Finland

ICT SHOK (TIVIT Oy) strategic research agenda definition group (Tekesin rahoittama uusi instrumentti), Lea Kutvonen, 01.08.2007 → 31.12.2007, Finland

INTEROP VLAB North Pole, Lea Kutvonen, 01.01.2007 → 31.12.2007

Member of HeCSE graduate school, Lea Kutvonen, 2007 → 2011, Finland

Secretary (academic coordinator) for drafting SRA on Flexible services ICT SHOK, Lea Kutvonen, 2007, Finland

Steering committee member at Department of Computer Science (cat: professors), Lea Kutvonen, 2007 → 2009, Finland

Vice member of HIIT board, Lea Kutvonen, 2007 → ..., Finland

#### **Toni Ruokolainen ,**

SOA expert, Toni Ruokolainen, 01.09.2010 → ..., Finland



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**Membership or other role of body in private company/organisation**

**Sasu Tarkoma ,**

Research proposal evaluation, Sasu Tarkoma, 01.02.2010 → 06.02.2010, China

**Sini Ruohomaa ,**

Member of board: Student organization TKO-äly ry, Sini Ruohomaa, 01.01.2006 → 31.12.2007, Finland

**Other tasks of an expert in private sector**

**Jussi Kangasharju ,**

Project reviewer for EU FP7, Jussi Kangasharju, 03.2009, Belgium

Project reviewer for EU FP7, Jussi Kangasharju, 05.2009, Belgium

Project reviewer for EU FP7, Jussi Kangasharju, 03.2010, Belgium

**Participation in interview for written media**

**Patrik Floréen ,**

Mobile Phones & a Cup of Coffee 2.0, Patrik Floréen, 2010, Finland

**Jussi Kangasharju ,**

Viestintäverkot ovat kovilla kriiseissä, Jussi Kangasharju, 14.01.2010, Finland

**Sini Ruohomaa ,**

UH infomercial in Kauppalehti's Tulevaisuuden teknologia, Sini Ruohomaa, 14.02.2005, Finland

**Participation in radio programme**

**Jussi Kangasharju ,**

Julkisen sana, Jussi Kangasharju, 25.10.2010, Finland

Surffilauta, Jussi Kangasharju, 03.11.2010, Finland

**Participation in TV programme**

**Jussi Kangasharju ,**

Prisma, Jussi Kangasharju, 2008, Finland

TV News, Jussi Kangasharju, 2008, Finland

YLE1 Prisma-TV-ohjelma, Jussi Kangasharju, 01.01.2008 → 31.12.2011, Finland

YLE1 TV-päätutiset, Jussi Kangasharju, 01.01.2008 → 31.12.2011, Finland

**Sini Ruohomaa ,**

Avoimesti koodista, Sini Ruohomaa, 13.10.2010, Finland

**Participation in interview for web based media**

**Patrik Floréen ,**

Always online, Patrik Floréen, 17.05.2010, Finland

## **Appendix B.b.**

**Maria Forsman**, Chief Information Specialist, DSocSc  
Helsinki University Library 7.7.2011

### **The bibliometric analyses by Helsinki University Library (HULib)**

**Background:** The bibliometric analyses – especially citation analyses – have raised a lot of discussion and critics among researchers in social sciences and humanities. Researchers view that bibliometric analyses are often unfair to these fields of sciences because they do not give a good enough picture of the publishing. Citation databases – Web of Science and Scopus – cover only weakly the main publications in these fields. Also, in humanities and social sciences monograph is still the main form of publishing, and it does not include in these article databases.

At the University of Helsinki, the above mentioned concerns have been taken into account in the evaluation. The Evaluation Office has ordered analyses from the Helsinki University Library (HULib) for the participating researcher communities that are weakly represented in Web of Science. The database for the HULib analyses is TUHAT (<https://tuhat.halvi.helsinki.fi/portal/en/>) including all the publications that the researchers have considered important.

Based on this data, information specialists at HULib have carried out the following analyses:

- 1) Number of authors/publication/year as a table; a pie of authors/publication in the period 2005-2010;
- 2) Language of publication/year; a pie of language of publication in the period 2005-2010;
- 3) Articles/journal/year; journals have been compared by ISSN with the Norwegian, Australian and ERIH (2007-2008) journal ranking lists; number of articles in ranked journals;
- 4) Publisher/monograph type (according to TUHAT database); monographs have been compared with the Norwegian publisher ranking list. According to this, it has been counted how many monographs are published by a leading scientific publisher (2) or a scientific publisher (1).
- 5) Conference publications (from TUHAT database) especially in computer sciences; compared with the Australian conference ranking list.

Where relevant, some additional analyses and notes concerning the publication culture of a scientific field have been added. Overall, these analyses complement the other evaluation material and lists of the publications of the participating researcher communities.

If the publications of the RCs were less than 50 or/and the internal coverage less than 40 percentage, the WoS analyses were considered not reliable. These RCs were 58 altogether.

In addition, both Leiden and Library analyses were done to the RCs if WoS analyses covered less than 40 per cent of the peer review (A+C) publications of the RC. These RCs were 8 altogether.

**The appendix includes the analyses of the RC under discussion.**

**Analysis of publications by Helsinki University  
Library – 66 RCs altogether**

**Biological, Agricultural and Veterinary Sciences**

Luukkanen, Olavi – VITRI  
Valsta, Lauri – SUVALUE

**Natural Sciences**

Abrahamsson, Pekka – SOFTSYS  
Kangasharju, Jussi – NODES  
Ukkonen, Esko – ALKO  
Väänänen, Jouko – HLG

**Humanities**

Aejmelaeus, Anneli – CSTT  
Anttonen, Pertti – CMVG  
Dunderberg, Ismo – FC  
Havu, Eva – CoCoLaC  
Heikkilä, Markku – RCSP  
Heinämaa, Sara – SHC  
Henriksson, Markku – CITA  
Janhunen, Juha – LDHFTA  
Kajava Mika, – AMNE  
Klippi, Anu – Interaction  
Knuuttila, Simo – PPMF  
Koskenniemi, Kimmo – BAULT  
Lauha, Aila – CECH  
Lavento, Mika – ARCH-HU  
Lukkarinen, Ville – AHCI  
Lyytikäinen, Pirjo – GLW  
Mauranen, Anna – LFP  
Meinander, Henrik – HIST  
Nevalainen, Terttu – VARIENG  
Pettersson, Bo – ILLC  
Pulkkinen, Tuija – Gender Studies  
Pyrhönen, Heta – ART  
Ruokanen, Miikka – RELDIAL  
Saarinen, Risto – RELSOC  
Sandu, Gabriel – LMPS  
Tarasti, Eero – MusSig  
Vehmas-Lehto, Inkeri – TraST  
Östman, Jan-Ola – LMS

**Social Sciences**

Airaksinen, Timo – PPH  
Engeström, Yrjö – CRADLE  
Granberg, Leo – TRANSRURBAN  
Haila, Anne – Sociopolis  
Hautamäki, Jarkko – CEA  
Heinonen, Visa – KUMU  
Helén, Ilpo – STS  
Hukkinen, Janne – GENU  
Jallinoja, Riitta – SBII  
Kaartinen, Timo – SCA  
Kettunen, Pauli – NordSoc  
Kivinen, Markku – FCREES  
Koponen, Juhani – DEVERELE  
Koskenniemi, Martti – ECI  
Kultti, Klaus – EAT  
Lahelma, Elina – KUFÉ  
Lanne, Markku – TSEM  
Lavonen, Jari – RCMSE  
Lehtonen, Risto – SocStats  
Lindblom-Ylänne, Sari – EdPsychHE  
Nieminen, Hannu – MECOL  
Nuotio, Kimmo – Law  
Nyman, Göte – METEORI  
Ollikainen, Markku – ENFIFO  
Pirttilä-Backman, Anna-Maija – DYNASOBIC  
Rahkonen, Keijo – CulCap  
Roos, J P – HELPS  
Simola, Hannu – SOCE-DGI  
Sulkunen, Pekka – PosPus  
Sumelius, John – AG ECON  
Vaattovaara, Mari – STRUTSI  
Vainio, Martti – SigMe

The next appendix includes the analyses of the  
RC under discussion.

## NODES / Kangasharju

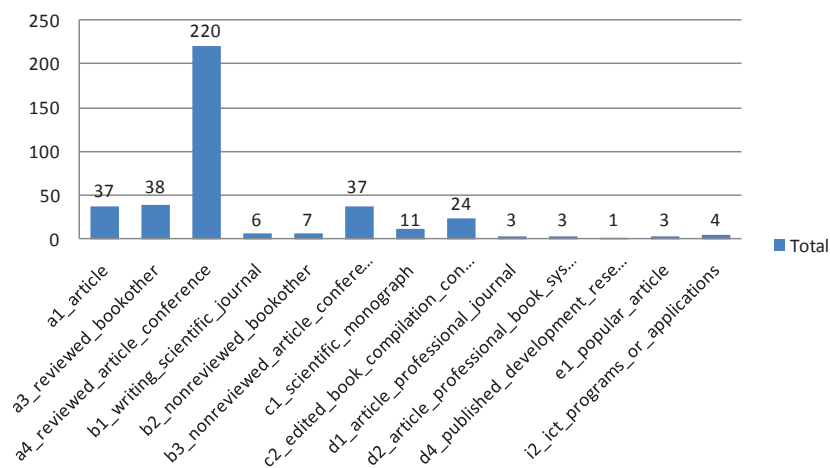
*Category 2. The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.*

The principles used in evaluating Computer Science are stated in *Research Evaluation for Computer Science: An Informatics Europe report* (2008)

[http://www.informatics-europe.org/docs/research\\_evaluation.pdf](http://www.informatics-europe.org/docs/research_evaluation.pdf)

### Basic Statistics

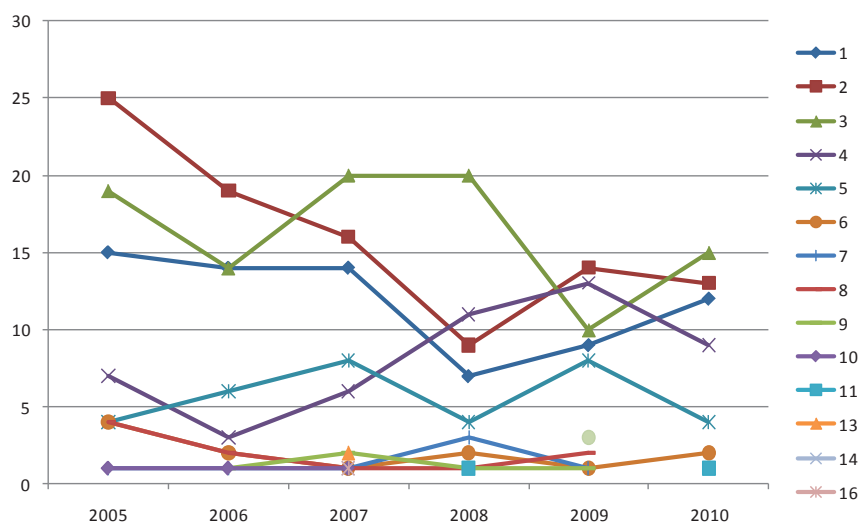
The group is moderately large, with 394 publications in TUHAT, showing a strong peak in A4 conference publications, typical for Computer Science, as shown in a chart with publication counts per classification:



It is typical that a publication has more than one author. The papers have on average 3.4 authors per publication. The following table shows the breakdown of papers with 1...18 authors:

# of Authors	Count
1	71
2	96
3	98
4	49
5	34
6	12
7-10	25
11-18	9
<b>Total</b>	<b>394</b>

The following chart shows the breakdown of the number of authors for each year:

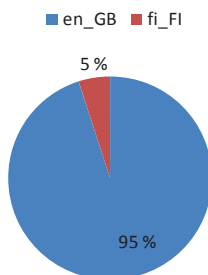


There are not enough papers (nor cites) in Web of Science for a quantitative analysis: only 29 papers out of a total of 394 publications, which is fairly typical for computer science.

### Language of publication / Year

The language of publications is mostly English, only 18 out of 394 articles are written in Finnish language. The Finnish language publications are mainly nonreviewed papers published by local publishers, associations and societies.

## Language 2005-2010



## ARC Conference Rankings

As could be expected, conference publications cover 65% of the output of this group. Conference data are not clearly indicated in TUHAT records, thus they were examined separately to find out matches with the Australian Research Council's (ARC) ranked conference list (2010): [http://www.arc.gov.au/era/era\\_journal\\_list.htm#2](http://www.arc.gov.au/era/era_journal_list.htm#2)

55 % of the conference publications can be found on the ARC list. Some of the conferences were too new or local to be found on the ARC list. A large part of the nonreviewed conference publications (b3) are presented in the local conferences. The rankings found (or the lack of rankings) are listed below:

ARC Rank	Count
A	49
B	64
C	29
none found	115
Total	257

A list of conference acronyms with (and without) ARC ranks is given below.

**A-ranked:** ACM PE-WASUN/MSWIM (2), BMP, CAiSE (2), CIKM, CoNEXT (2), CoopIS, DEBS/ICDCS/SIGMOD/PODS (3), DISC, ECAI/TIR, ESA, ICDCS, ICSOC (2), ICWS, IEEE INFOCOM, IMC, IPDPS, IUI (2), LCN (3), MOBICOM, Ubiquitous (3), NPSec/ICNP, PERCOM (3), PERSASIVE, PODC (2), SIGCOMM (2), SIGIR, SOCP/HPDC, SPAA (2), UbiComp (2), WISE, WSW/SenSys, WWW

**B-ranked:** ADHOC-NOW, AINA (was ICOIN)(6), ARES (2), DAIS (IFIP International Conference on Distributed Applications and Inoperable Systems), DEXA (2), EDOC (10), IC, ICC (IEEE International Conference on Communications), IEEE CCNC (2), IEEE GLOBECOM (5), ISCC, ISWC (International



Semantic Web Conference) (17), IWQoS, MobileHCI (2), Mobisys, MobiWac, PIMRC (3), SAC, SECON (3), SOFSEM, UM/UMAP, WiOpt

**C-ranked:** Algosensors (3), CMS, DC (International Conference on Dublin Core and Metadata Applications) (2), IASTED (4), ICIW, iTrust (2), LOCALALGOS, MACIS, MDM (2), MobiDE, NEW2AN, NordSec (2), PRO-VE (IFIP Working Conferences on Virtual Enterprises)(2), PSD, SAINT, SSS, WEBIST, WI-IAT, WiMob

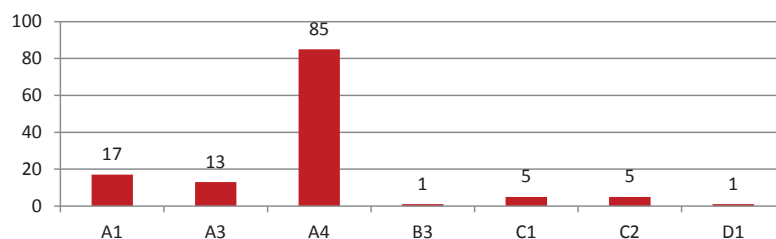
**No rank listed:** AccessNets, ACM DocEng, AIS (Autonomous Intelligent Systems), Aml-Blocks, AMICT (6), ASWC (8), ASWN, BODYNETS (International ICST Conference on Body Area Networks)(2), CAPS (4), CEUR, CEUR/SEMMA, CEUR-WS, CNS, CULTURAL HERITAGE on line, DH-JAC, ESWC (European Semantic Web Conference)(16), ESWC ( Extended Semantic Web Conference)(3), FDPW (2), Finnish Artificial Intelligence Conference STeP (3), FIRST, Helsinki-Rutgers PhD Student Workshop on Spontaneous Networking, ICAI, ICAME, ICCCN, ICN, ICSD (2), ICT-Mobile Summit, IDAR, IEEE ICSC (International Semantic Computing Conference), IEEE International Conference on Distributed Human-Machine Systems, INC, Intelligent Environments, International Conferences on Digital Libraries and the Semantic Web, International SDL Forum, INTEROP-ESA (International Conference on Interoperability of Enterprise Software and Applications)(4), IST Mobile & Wireless Communications Summit (3), IS-TSPQ (3), ITC (International Teletraffic Congress), IWCT, IWWAN (2), LinuxConf Europe (2), Maanmittaustieteiden päivät, MATA, MDEIS/INSTICC, MIE, MLCW, MobiSec/ ICST (Institute for Computer Sciences, Social Informatics and Telecommunications Engineering), Modies, Museums and the Web, NGMAST, NGNM, Norwegian Semantic Days, ORES (3), OTM (2), PervasiveHealth, PFLDNeT, PGM, PSC (International Conference on Pervasive Systems and Computing), SADA, SFSW/ESWC, TDWG (3), Tietojenkäsittelytieteen päivät, WODPEC, Workshop on Applications of Wireless Communications

## Publish or Perish (Google Scholar) data

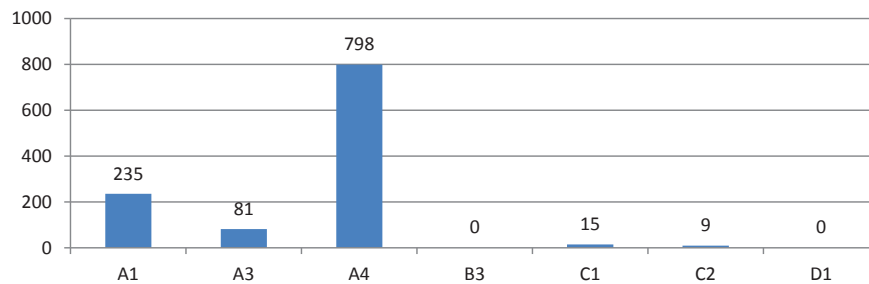
A Publish or Perish (PoP) search with names of the NODES team members shows that the publication data from TUHAT seems incomplete. Several refereed papers are missing from the group's list of publications. On the other hand, PoP is missing some of the listed publications.

We included 127 papers/titles that are in TUHAT and can also be found with PoP. The following charts summarize the findings (citation count date: July 2, 2011):

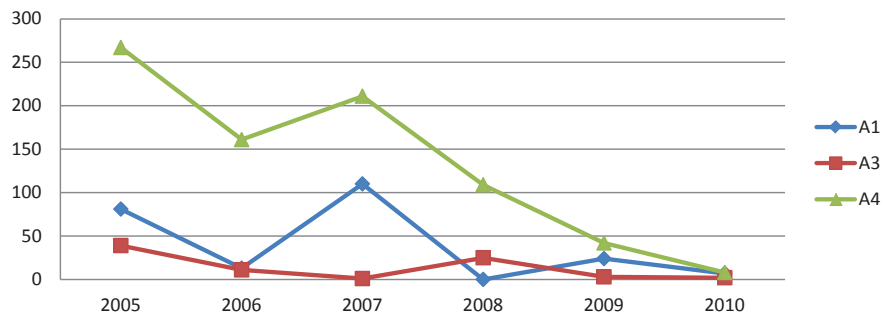
The PoP publication counts per class match the TUHAT publications distribution quite well:



Out of 127 PoP publications, 18% are uncited. Refereed A4 papers are the most cited in PoP, leaving refereed scientific articles clearly behind:



Three publication types have a significant amount of citations, broken down by year as follows:



## ACM

The ACM database <http://portal.acm.org> includes bibliographic citations from major publishers in computing, but only a part of the papers can be found in the database. 6 out of 34 NODES team members are listed as Principal Investigators. Bibliometric ACM summaries of the PIs including both citation and download counts (for ACM publications available for download) are listed below. Note that in the ACM database, one cannot choose the appropriate time range for the analysis.

Floréen Patrik:	<a href="http://portal.acm.org/author_page.cfm?id=81100325457">http://portal.acm.org/author_page.cfm?id=81100325457</a>
Jacucci Giulio:	<a href="http://portal.acm.org/author_page.cfm?id=81100644548">http://portal.acm.org/author_page.cfm?id=81100644548</a>
Kangasharju Jussi:	<a href="http://portal.acm.org/author_page.cfm?id=81100605202">http://portal.acm.org/author_page.cfm?id=81100605202</a>

Kojo Markku: [http://portal.acm.org/author\\_page.cfm?id=81100092108](http://portal.acm.org/author_page.cfm?id=81100092108)

Kutvonen Lea: [http://portal.acm.org/author\\_page.cfm?id=81100141491](http://portal.acm.org/author_page.cfm?id=81100141491)

Tarkoma Sasu: [http://portal.acm.org/author\\_page.cfm?id=81100433944](http://portal.acm.org/author_page.cfm?id=81100433944)

Some key data for the PIs are summarized in the following table.

PI	Years in ACM	Publication Count	Citation Count	Docs for download	Downloads 6 weeks	Downloads 12 months	Colleagues
Floréen	1990-2010	22	48	11	42	416	32
Jacucci	1998-2010	33	288	25	447	3324	77
Kangasharju	1998-2011	28	96	13	27	341	29
Kojo	1994-2010	9	29	4	21	162	13
Kutvonen	1993-2010	15	22	1	0	21	10
Tarkoma	2001-2010	34	69	15	66	507	36

## CiteSeer

As suggested by the Informatics Europe report, CiteSeer database at <http://citeseerx.ist.psu.edu> was checked for PIs, but the database seems not to be up to date. None of the PIs were found in the CiteSeer list of most cited computer science authors.

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