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

RC-Specific Evaluation of MATENA – Materials- and Nanophysics Researcher Community

Seppo Saari & Antti Moilanen (Eds.)
RC-Specific Evaluation of MATENA – Materials- and Nanophysics Researcher Community

Seppo Saari & Antti Moilanen (Eds.)
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.

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. Panelists, 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.

Chapters in the report:
1. Background for the evaluation
2. Evaluation feedback for the Researcher Community
3. List of publications
4. List of activities
5. Bibliometric analyses

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.

RC-specific information:

Main scientific field of research: Natural Sciences
RC-specific keywords: Materials, nanostructures, synchrotron radiation, ion beams, X-rays, carbon based materials

Participation category:
1. Research of the participating community represents the international cutting edge in its field

RC’s responsible person:
Räisänen, Jyrki

Keywords:
Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community
## Contents

Panel members ........................................................................................................................................ 1  

1 Introduction to the Evaluation .................................................................................................................. 5  
1.1 RC-specific evaluation reports .............................................................................................................. 5  
1.2 Aims and objectives in the evaluation ................................................................................................... 5  
1.3 Evaluation method ................................................................................................................................. 5  
1.4 Implementation of the external evaluation ............................................................................................. 6  
1.5 Evaluation material ............................................................................................................................... 7  
1.6 Evaluation questions and material ......................................................................................................... 8  
1.7 Evaluation criteria ................................................................................................................................. 10  
1.8 Timetable of the evaluation ................................................................................................................... 13  
1.9 Evaluation feedback – consensus of the entire panel ........................................................................... 13  

2 Evaluation feedback ............................................................................................................................. 15  
2.1 Focus and quality of the RC’s research ................................................................................................. 15  
2.2 Practises and quality of doctoral training ............................................................................................. 16  
2.3 The societal impact of research and doctoral training ......................................................................... 17  
2.4 International and national (incl. intersectoral) research collaboration and researcher mobility ......... 17  
2.5 Operational conditions ......................................................................................................................... 18  
2.6 Leadership and management in the researcher community ............................................................... 18  
2.7 External competitive funding of the RC .............................................................................................. 18  
2.8 The RC’s strategic action plan for 2011–2013 ..................................................................................... 19  
2.9 Evaluation of the category of the RC in the context of entity of the evaluation material (1-8) ............ 20  
2.10 Short description of how the RC members contributed the compilation of the stage 2 material ... 20  
2.11 How the UH’s focus areas are presented in the RC’s research ......................................................... 20  
2.12 RC-specific main recommendations ................................................................................................... 20  
2.13 RC-specific conclusions ....................................................................................................................... 21  
2.14 Preliminary findings in the Panel-specific feedback ......................................................................... 22  
2.15 Preliminary findings in the University-level evaluation ..................................................................... 22  

3 Appendices ............................................................................................................................................. 23
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 lead 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 Pyhältö
Director of Strategic Planning and Development, Dr Ossi Tuomi
Doctoral candidate, MScSc 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 Molanen, 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 Aija Kaitera, 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 Ekebom, 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.

**HELSPINK 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 emphasize that the evaluation combines both meta-evaluation\(^1\) 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.\(^2\)
- 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.

\(^1\) 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.

\(^2\) 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.

---

<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 RC’s 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
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”.

10
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)**

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.

---

5 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
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

The Materials- and Nanophysics Community MATENA belongs to the Helsinki University focus area “The basic structure, materials and natural resources of the physical world”. MATENA includes 5 professors (all PIs), 17 lecturers (1 PI), 3 senior researchers, 20 post docs, 27 PhD students. The competitive funding is distributed as follows: AF 5.6 M€, TEKES 0.44 M€, EU 0.63 M€, other international and national funding 0.73 M€. The scientific output has been somewhat more than 400 refereed articles during 2005-2010. The field-normalized number of citation per publication is 23% above average.

The research focus is directed towards materials physics and nanotechnology and the understanding of materials properties from the atomic level. Fabrication of materials by various techniques, advanced materials analytical techniques, particularly ion beam analysis together with computer simulations are core components in the research. Basically all materials categories are covered; semiconductors, carbon nanotubes, graphene, superconductors, biomaterials, just to mention a few. Even if the research is basic to its character, the research is of relevance for many application areas as indicated by the many materials categories represented in the publications.

MATENA scientists have a long tradition in developing and using ion beams and X-ray/synchrotron radiation techniques in their materials research. They have contributed significantly to the impressive development in these areas and their expertise is recognized worldwide. MATENA is involved in large collaborations at different facilities (ESRF, CERN, APS, etc.). At the upgrade of ESRF, MATENA scientist play a key role.

The scientific productivity within MATENA is very high with many international collaborations. MATENA is also a heavy international player due to the high activity level at the large scale facilities but also due to research directions and quality. The research quality is judged to be very high and MATENA scientists have during 2005 to 2010 given 65 keynote/plenary lectures or invited talks. A further indication of the quality of the research is that PhDs from MATENA are frequently offered post doc positions in top-ranked research groups.

The significance of the research is very high. MATENA has developed techniques and methods of importance for the whole materials science area. Moreover, MATENA has a leading research role at ESRF and in the development of GRID in Finland. The significance also expands to areas like accelerator technology, fusion technology, semiconductor technology, solar cells, electrode materials for energy storage, and many other application areas. Finally, the MATENA research environment is judged to be excellent for education of PhDs due the quality, research directions, international visibility and the international collaborations.

Materials science is a focus area for the Faculty of Science at UH. Materials science is true multidisciplinary with costly needs of equipment at all levels. The intense international collaborations at the large-scale facilities was appreciated by the Panel. However, the Panel judges that there may be needs for more local co-operations within the university in order to strengthen the materials science at the university and to coordinate infrastructural planning and investments in capital equipment.

Numeric evaluation: 4 (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**

The recruitment of the doctoral candidates takes place after applications. The recruitment is international with candidates from many countries. Principles for recruitment and selection of candidates was not further described in the evaluation documents.

Each candidate has one responsible supervisor on the level of professor/senior scientist. Post docs are actively involved in the supervision. At the beginning of the doctoral training a study plan is decided and progress of the training is followed continuously.

MATENA is involved in two national graduate schools, materials physics and nanoscience, where MATENA scientists give many basic courses. Courses in nanoscience, given by the best experts in the area in Finland, is coordinated by MATENA. MATENA is also involved in several international summer schools together with international research collaborators.

Important criteria for doctoral training are fulfilled at MATENA: Exposure to excellent research, critical mass of the research environment, access to state-of-the-art infrastructure and many international collaborations. MATENA is also involved in national graduate schools as well as international summer schools. The supervision capacity is appropriate. In addition to the professors/senior scientists there are quite a few post docs involved in the supervision.

MATENA is involved in an impressive number international collaborations and the PhD students are exposed to many research environments. Most PhD students spend a relatively long time of their training at large scale facilities, which means that they are exposed to research at a much wider environment than normal. The spending of some months of the PhD training at foreign universities was very much appreciated.

The quality assurance in the doctoral training is the publishing in international reviewed journals, the PhD examination procedure, and finally the continued career as a post doctoral researcher at university or in industry. A good indication of the quality of the PhDs produced is how attractive they are for post doc positions within the country and abroad. MATENA doctors are very well received in big research collaborations and are offered post doc positions at the best laboratories.

The strengths of the doctoral training within MATENA is the research itself, the international collaborations, involvement in the national graduate schools and the international summer schools, the size of the research environment, the supervision capacity and the infrastructure. The Panel could not see in the evaluation documents if there is any annual revision of the study plans for the PhD students. Even if the supervisor and the student meet on nearly a daily basis a planned deeper discussion of the progress for the candidate is always appreciated.

**Numeric evaluation: 5 (Outstanding)**
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

The production of highly skilled PhDs, used to work in international collaborations, has probably the biggest societal impact. The research areas selected by MATENA will have an impact on the development of the future society in general.

The Panel was pleased to see that MATENA was involved in many outreach activities, for example the physics demonstrations at railway station in Helsinki, participation in the outreach conference “Tieteen-päivät”, and last but not least the continued education of school teachers.

The studies of plasma-material interactions is a research direction of great importance for society in general to be able to design accelerators for the next generation (CLIC, synchrotron radiation facilities, medical applications) and fusion reactors.

The initiatives taken to increase the societal impact were well received. Closer contacts with alumni is a proved way to go. An openness for new research areas meeting future needs in society would be favorable for a positive development for MATENA. Closer co-operations with groups across disciplinary borders (medicine, biotechnology, environment, communication technology, ..) within UH might be of interest.

The studies of plasma-material is a research direction of great importance to society in general to be able to design the next generation accelerators (CLIC) and fusion reactors (ITER). The synchrotron work at ESRF attracts broad public interest.

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

There is an extensive international and national research collaboration within MATENA. Several PhD students are working full time in research collaborations at the large scale facilities abroad (CERN, SCK-CEN, Oak Ridge Lab, ESRF, etc.). MATENA is also involved in other research networks (COST projects and Nordforsk funded Nordic networks) MATENA is also a key player in national joint research projects.

Participation of doctorate candidates in national graduate schools and in summer schools promote also mobility. MATENA scientists take big responsibilities in the national graduate schools in materials science and nanoscience.

MATENA has a strong international research collaboration profile. MATENA scientists participate in many large scale facility projects all the way from design of facilities to interpretation of data. This activity promotes research quality, visibility and mobility in and out. Challenges for the future include keeping the research level and even increasing it, promotion of the number of permanent staff members at large-scale facilities, increasing interactions within the materials science platform in the Faculty, recruitment of personnel at all levels and keeping and even improving the research infrastructure at the university.

Numeric evaluation: 4 (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

MATENA has access to the state-of-the-art infrastructure including also the laboratory facilities. The accelerator facilities for materials fabrication and analysis are in the front and practically all materials characterization techniques are available at MATENA.

Also the computer facilities are at the top. Computer simulations are extremely important in material science and nanoscience and MATENA is a big user of computer facilities of different capacities. MATENA has also a leading role in the development of GRID and other distributed computing in Finland.

MATENA is involved in the teaching at the Department of Physics and responsible for the curriculum in materials physics. The PIs give lectures on a regular basis and all the METENA members are involved in the teaching.

The Panel was impressed by the infrastructure within the Department of Physics and MATENA. The challenges include funding of replacement and up-grading of equipment as well as renewal. A long-term strategic planning of the future needs of equipment and infrastructure is required. Participation in the long-term planning of infrastructure at the EU level (ESFRI) is also recommended. Concerning the balance between teaching and research within MATENA there was no specific issue raised in the evaluation report.

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

MATENA in itself is organized informally and can be considered as a division of materials physics at the Department of Physics. The leadership of MATENA is based on collaborations and consensus among the team leaders. Important decisions are prepared within a board of group leaders.

Concerning the executive management there are two technical managers in charge of the facilities. MATENA provides basic technical service and support for the research groups.

It was difficult for the Panel to really judge the leadership and management philosophy behind the MATENA. The relation between MATENA and the Department was not clear. An informal consensus structure might work well provided that the organization of the Department is solid.

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

The external competitive funding for 2005-2010 is summarized below:

- AF: 5.6 M€
- TEKES: 0.44 M€
- EU: 0.63 M€
- ERC: 0
- International and national foundations: 0.16 M€
- Other international funding: 0.2 M€
- Other national funding: 0.53 M€

MATENA is heavily funded by the Academy of Finland indicating high quality as well as a profile towards more basic research. There might be openings for more research funding, e.g. from TEKES and EU, by making efforts in joining the strong basic research with more applied research, perhaps through co-operations within UH.

Other alternatives include addition of research directions, e.g. towards medicine, biotechnology, energy and environmental science. In the next EU Framework Program, FP8, quite a lot of emphasis will be put on the grand challenges like Health, Energy and Environment. Finally, participation in Marie Curie programs would be also an option.

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

The Panel was pleased to note that MATENA builds the future on its strength with openings to also add new research areas to its activities. The strategic action plan I summarized below:

- Increased research activities and doctoral training in-house in nanoscience.
- Accelerator Mass Spectrometry (AMS) towards aerosol science will be developed.
- International collaboration for studies on irradiation effects on materials (CERN, CMS)
- Experimental structural studies of material at the micron and subnano scale at various synchrotron and free electron laser facilities (ESRF, X-FEL, MAX IV).
- Use and development of computer simulation methods.
- Computational studies of plasma-material interactions for applications in ITER and CLIC, and for both space research and industrial applications.

With this strategic action plan the national and international collaborations will increase and so will probably the funding also.

Recruitment of top-scientists and top-students is the key issue for groups which would like to be in the lead. There are a lot of factors making a laboratory attractive. Quality of research, research directions, facilities, long-term planning, stable research funding, etc. The Panel judges that the changes indicated by the strategic action plan will improve recruitment.

Investments in infrastructures like MATENA’s cost a lot of money and requires longer planning perspectives. Materials is a focus area for the Natural Science Faculty at UH and a wider strategic infrastructural discussion across disciplinary borders is recommended.
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 1. The research of the participating community represents the international cutting edge in its field.

The RC MATENA fits the criteria for the category 1 in an excellent way. Cutting edge research is carried out in materials science. The international and national collaborations are impressive with involvement in many projects of different profiles at large-scale facilities as CERN, ESRF, ITER to just mention a few. The research funding by AF is impressive but funding from other agencies could be increased, probably by developing research profiles further.

The strategic action plan for 2011-2013 is very interesting. It includes strengthening of the internationalization and at the same time increasing activities in the in-house nanoscience research. Moreover, there are also changes in the research directions opening for a broader funding basis. The doctoral training within the RC is excellent.

The candidates are exposed to top-level research in a big enough research environment with state-of-the-art infrastructure. The international co-operations with important collaborations at many large-scale facilities strengthen the training of the PhD students. The involvement of the MATENA in national graduate schools and as well as summer schools was significant. Supervision capacity and structure were in balance and both professors and post docs were active supervisors.

Organisation management structure of the RC was unclear. MATENA has an informal consensus decision structure, whose relation to the overall structure of the Department of Physics was unclear.

Numeric evaluation: 4 (Excellent)

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

The RC leader prof Räisänen was the main author of the evaluation report and the PIs commented on the report and the compilation of data.

2.11 How the UH’s focus areas are presented in the RC’s research

Focus area 1: the basic structure, materials and natural resources of the physical world

The UH’s focus areas seem to be very wide and a little bit unfocused. MATENA belongs to the focus area “The basic structure, materials and natural resources of the physical world”. No special attention was paid on how the university focus areas were presented in MATENA in the evaluation documents.

2.12 RC-specific main recommendations

The Panel was impressed by the unique blend of theory and experiments, the quality of the research, the international visibility, the international collaborations and by the doctorate training. A further development along initiatives in the above-mentioned areas is recommended.

Recruitment of top-scientists and top-students is the key issue for groups which would like to be in the lead. There are a lot of factors making a laboratory attractive. Quality of research, research directions, facilities, long-term planning, stable research funding, etc. The Panel supports the changes indicated by the strategic action plan to improve recruitment.
Investments in infrastructures like MATENA’s cost a lot of money and requires longer planning perspectives. Materials is a focus area for the Natural Science Faculty at UH and a wider strategic infrastructural discussion across disciplinary borders is recommended.

There is a potential to widen the research topics within MATENA by taking initiatives to co-operations across disciplinary borders, which should be of mutual interests.

Participation in the long-term planning of infrastructure at the EU level (ESFRI) is recommended.

In order to increase research funding efforts should be made to join the strong basic research with more applied research.

2.13 RC-specific conclusions

The Materials- and Nanophysics Community MATENA belongs to the Helsinki University focus area “The basic structure, materials and natural resources of the physical world. The research focus is directed towards materials physics and nanotechnology and the understanding of materials properties from the atomic level.

The scientific productivity within MATENA is very high with many international collaborations. MATENA is also a heavy international player due to the high activity level at the large scale facilities but also due to research directions and quality. The research quality is judged to be very high and MATENA scientists have during 2005 to 2010 given 65 keynote/plenary lectures or invited talks. A further indication of the quality of the research is that PhDs from MATENA are frequently offered post doc positions in top-ranked research groups.

The significance of the research is very high. MATENA has developed techniques and methods of importance for the whole materials science area. The significance also expands to areas like accelerator technology, fusion technology, semiconductor technology, solar cells, electrode materials for energy storage, and many other application areas.

Materials science is a focus area for the Faculty of Natural Science at UH. Materials science is true multi-disciplinary with costly needs of equipment at all levels. The intense international collaborations at the large-scale facilities was appreciated by the Panel. However, the Panel judges that there may be needs for more local co-operations within the university in order to strengthen the materials science are at the university and to coordinate infrastructural planning and investments in capital equipment.

Important criteria for doctoral training are fulfilled at MATENA: Exposure to excellent research, critical mass of the research environment, access to state-of-the-art infrastructure and many international collaborations. MATENA is also involved in national graduate schools as well as international summer schools. The supervision capacity is appropriate. In addition to the professors/senior scientists there are quite a few post docs involved in the supervision.

MATENA has access to the state-of-the-art infrastructure including also the laboratory facilities. The accelerator facilities for materials fabrication and analysis are in the front and practically all materials characterization techniques are available at MATENA. Also the computer facilities are at the top. Computer simulations are extremely important in material science and nanoscience and MATENA is a big user of computer facilities of different capacities. MATENA has also a leading role in the development of GRID and other distributed computing in Finland. The challenges include funding for replacement and up-grading of equipment as well as renewal, requiring a long-term strategic planning.

The Panel was pleased to note that MATENA builds on its strength for the future with openings to also add new research areas to its activities. The strategic action plan includes increased nanoscience activities, aerosol research, irradiation effects on materials, plasma-materials interactions, more focus on synchrotron and free electron laser facilities, and development of computer simulation methods.

The RC MATENA fits the criteria for the category 1 in an excellent way. Cutting edge research is carried out in materials science. The international and national collaborations are impressive with involvement in many projects of different profiles at large-scale facilities as CERN, ESRF, ITER to just mention a few. The research funding by AF is impressive but funding from other agencies could be increased, probably by developing research profiles further.
2.14 Preliminary findings in the Panel-specific feedback

The Materials and Nanophysics Community, MATENA, includes some 60 people with a predominating external funding by AF. The quality of the research was judged to be excellent and the doctoral training was excellent. Societal impact as well as national and international collaborations were excellent.

The recommendations for the MATENA RC are as follows:

- Recruitment of top-scientists and top-students is the key issue for groups which would like to be in the lead. The Panel supports the changes indicated by the strategic action plan to improve recruitment.
- A wider strategic infrastructural discussion across disciplinary borders is recommended.
- There is a potential to widen the research topics within MATENA by taking initiatives to co-operations across disciplinary borders, which should be of mutual interests.
- Participation in the long-term planning of infrastructure at the EU level (ESFRI) is recommended.
- In order to increase research funding efforts should be made to join the strong basic research with more applied research.

For the UH level report:
- International recruitment of top-scientist. Any university strategic recruitment program?
- Any mentor program for post docs?
- Is there any leadership program for RCs?
- Management training program?
- Planning of infrastructure at the university?
- Co-planning of EU infrastructure, national and university?

2.15 Preliminary findings in the University-level evaluation

- Rules for admission of PhD students and revision of study plans?
- International recruitment of top-scientist. Any university strategic recruitment program?
- Any mentor program for post docs?
- Is there any leadership program for RCs?
- Management training program?
- Planning of infrastructure at the university?
- Co-planning of EU infrastructure, national and university?
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:
Materials- and Nanophysics Research Community (MATENA)

LEADER OF THE RESEARCHER COMMUNITY:
Professor Jyrki Räisänen, Department of Physics, Faculty of Science

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’ other scientific activities 1.1.2005-31.12.2010
  (analysis carried out by CWTS, Leiden University)

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: Räisänen, Jyrki
E-mail:
Phone: (09) 19150082
Affiliation: Department of Physics, Faculty of Science
Street address: Gustaf Hällströmin katu 2a

2 DESCRIPTION OF THE PARTICIPATING RESEARCHER COMMUNITY (RC)

Name of the participating RC (max. 30 characters): Materials- and Nanophysics Researcher Community
Acronym for the participating RC (max. 10 characters): MATENA
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): The Researcher Community MATENA is an interdisciplinary and compact entity in research and education. Scientific versatility is realized by the complementary competences of the researchers.

The researchers of MATENA are responsible for the major part of the research infrastructure in the Physics Department and utilize large international research infrastructures. The research groups forming MATENA have long-term mutual research collaboration.

Doctoral training in MATENA is connected to two national graduate schools, namely to those in materials physics and nanoscience. The basis of the training comprises the graduate and postgraduate level courses in the curriculum of the Physics Department, which the senior research personnel of MATENA is responsible for. The courses are in solid state physics, materials research, surface physics, ion beam physics, synchrotron radiation physics, and computational physics. They form the major study lines materials physics and computational physics.

3 SCIENTIFIC FIELDS OF THE RC

Main scientific field of the RC’s research: natural sciences
RC’s scientific subfield 1: Physics, Condensed Matter
RC’s scientific subfield 2: Materials Science, Characterization, Testing
RC’s scientific subfield 3: Nanoscience and Nanotechnology
RC’s scientific subfield 4: Materials Science, Coatings and Films
Other, if not in the list:
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

4 RC'S PARTICIPATION CATEGORY

Participation category: 1. Research of the participating community represents the international cutting edge in its field

Justification for the selected participation category (MAX. 2200 characters with spaces): - Extensive, long-term, internationally recognized scientific research with high standards.
- Long tradition in training of doctoral students.
- Pioneer work in Finland in use of ion beams in materials research.
- Leading national role in the research accomplished at the ESRF large-scale facility.

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 mission of MATENA is to carry out research in timely key issues of atom-level materials physics at the highest international level and to train students in research. An essential part of the research is development of new ion beam and x-ray methods and their interlinking via atomistic simulations. The cornerstone of the activity is a close integration of research and educational efforts. The research is closely linked to collaboration with international large-scale facilities, such as ESRF, CERN and ITER. The work undertaken by the experimentalists and computational scientists covers a wide range, e.g. nanostructured semiconductors, carbon-based materials nanotubes and graphene, metals, and biomaterials.

The equipment acquired mostly with research project based funding has enabled creation and implementation of original and versatile research program in materials and nanophysics. The research has resulted in new information on various physical processes, development of better methods for preparation of nanomaterials and their characterization, and development of new materials.

The studies include thin film characterization and related novel method development, photonics applications in silica, properties of novel semiconducting materials (CERN/ISOLDE), first wall materials in fusion energy research (ITER), and electronic structures of inorganic and biomaterials (ESRF). Atom-level computer simulations have complemented the experimental work.

Postgraduate students are selected by applications only. Each student has a responsible supervisor appointed among the professors or senior researchers. A detailed study and research plan is required in the beginning of the postgraduate studies and the progress is followed continuously. Young researchers have important roles in all projects of MATENA. The broad contacts to the international community provide excellent possibilities for young scientists to advance their research careers. They have the possibility to gain experience by working in international research groups at foreign laboratories.

Significance of the RC's research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): The MATENA activities strengthen the research carried out at campuses of the
University of Helsinki (UH) (Kumpula, Viikki and Meilahti) in the fields of materials- and nanosciences. Also the prominent research infrastructure of UH in these fields is effectively utilized.

The effective use of the domestic and international large-scale facilities, not only through scientific visits but also via scientists of MATENA working in such facilities on long term basis, increases the international visibility of UH.

Regular graduate courses on condensed matter physics and materials physics organized by the Physics Department form the basis of doctoral training.

Doctoral training has been strengthened by initiating the nanoscience teaching curriculum in the Helsinki region. A set of courses "Nanoscience I-IV" that cover the whole range of nanoscience, from hard matter nanocrystals to using living cell membranes and viruses as nanoscience tools. This course complex, which has as lecturers the best nanoscience experts in Finland, is coordinated by MATENA.

The doctoral students participate in international summer schools and training courses organized by synchrotron facilities, graduate schools, and research networks (COST actions, Nordforsk funded Nordic network of soft matter physics etc). Physics Department also gains visiting doctoral students via these networks (e.g. Cost short term scientific missions).

**Keywords:** Materials, nanostructures, synchrotron radiation, ion beams, X-rays, carbon based materials

### 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 versatile research program of MATENA and its development is tightly connected to the physics of the 21st century. The research and researchers of MATENA are internationally visible, as evidenced by the success in scientific achievements and education, for example the positions of trust of the researchers, about 280 articles in high-ranking international journals, and 25 PhD theses based on the research in MATENA and international collaborations. It is a tradition that after the PhD exam many of the MATENA researchers continue in foreign laboratories, which is also due to the visibility of MATENA. Efficient postdoctoral education is evidenced by the high number of docentships related to the research in MATENA.

**Comments on how the RC’s scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces):** Scientific productivity:
- Bibliometric: numbers of publications in international journals and in the high-impact journals
- Bibliometric: visibility of the scientific productivity
- Peer review: quality of the productivity and visibility in the science community
- use of the infrastructures in the Department and in foreign laboratories
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

Doctoral training:
- number of PhDs
- organization of the PhD training
- fraction of researcher continuing abroad as post docs
- success of PhDs in the research carrier
# LIST OF RC MEMBERS

**NAME OF THE RESEARCHER COMMUNITY:** Materials- and Nanophysics Researcher Community (MATENA)

<table>
<thead>
<tr>
<th>RC-LEADER</th>
<th>1. Räisänen</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Last name</th>
<th>First name</th>
<th>PI-status (TUHAT, 29.11.2010)</th>
<th>Title of research and teaching personnel</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahlgren</td>
<td>Tommy</td>
<td>University Lecturer</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Aitollo</td>
<td>Kerttu</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Arstila</td>
<td>Kai</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Avvatchov</td>
<td>Konstantin</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Björkas</td>
<td>Carolina</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Chrobak</td>
<td>Dariusz</td>
<td>Senior Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Costelle</td>
<td>Leila</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Djarbekova</td>
<td>Flyura</td>
<td>Senior Researcher</td>
<td>HIP</td>
<td></td>
</tr>
<tr>
<td>Fernandez</td>
<td>Manuel</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Galmansko</td>
<td>Szabolcs</td>
<td>University Lecturer</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Hakala</td>
<td>Mikko</td>
<td>Senior Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Harjumaa</td>
<td>Ari</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Heinola</td>
<td>Kalle</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Hirvelä</td>
<td>Jenni</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Holmström</td>
<td>Eero</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Huotari</td>
<td>Simo</td>
<td>University Lecturer</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Hämäläinen</td>
<td>Keijo</td>
<td>x Professor</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Ikonen</td>
<td>Teemu</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Jalkanen</td>
<td>Pasi</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Jansson</td>
<td>Ville</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Juurinen</td>
<td>Ilia</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Keinonen</td>
<td>Juhani</td>
<td>x Professor</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Keyriläinen</td>
<td>Jani</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Kisko</td>
<td>Kaisa</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Koskelo</td>
<td>Otso</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Krasheninnikov</td>
<td>Arkady</td>
<td>Senior Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Kuronen</td>
<td>Antti</td>
<td>x University Lecturer</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Lasa</td>
<td>Aine</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Laukkanen</td>
<td>Jarkko</td>
<td>University Lecturer</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Lehtinen</td>
<td>Ossi</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Lehtola</td>
<td>Juusi</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Leppänen</td>
<td>Kirsi</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Mattila</td>
<td>Alekski</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Meinander</td>
<td>Kristoffer</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Mizohata</td>
<td>Kenichiro</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Nordlund</td>
<td>Kai</td>
<td>x Professor</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Nygård</td>
<td>Kim</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Pakarinen</td>
<td>Olli</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Palonen</td>
<td>Vesa</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Parviainen</td>
<td>Stefan</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Peura</td>
<td>Marko</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Pinkalainen</td>
<td>Kari</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Pirjenko</td>
<td>Alexandre</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Pohjonen</td>
<td>Aarne</td>
<td>Doctoral Candidate</td>
<td>HIP</td>
<td></td>
</tr>
<tr>
<td>Polvi</td>
<td>Juusi</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Porra</td>
<td>Liisa</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Pusa</td>
<td>Petteri</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Pylkänen</td>
<td>Tuomas</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Rauhala</td>
<td>Eero</td>
<td>University Lecturer</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Ruotsalainen</td>
<td>Kari</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Ruzibaev</td>
<td>Avaz</td>
<td>Doctoral Candidate</td>
<td>HIP</td>
<td></td>
</tr>
<tr>
<td>Räisänen</td>
<td>Jyrki</td>
<td>x Professor</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Sajavaara</td>
<td>Timo</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Sakko</td>
<td>Arto</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Serimaa</td>
<td>Ritva</td>
<td>x Professor</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Soininen</td>
<td>Alekski</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Suohonen</td>
<td>Helki</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Timko</td>
<td>Helga</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Tolvanen</td>
<td>Antti</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Torkkeli</td>
<td>Mika</td>
<td>University Lecturer</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Tuboltsev</td>
<td>Vladimir</td>
<td>Senior Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Ullah</td>
<td>Mohammad</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Väyrynen</td>
<td>Samuli</td>
<td>Postdoctoral Researcher</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
<tr>
<td>Wörtter</td>
<td>Katharina</td>
<td>Doctoral Candidate</td>
<td>Faculty of Science, Department of Physics</td>
<td></td>
</tr>
</tbody>
</table>
Name of the RC's responsible person: Räisänen, Jyrki

E-mail of the RC's responsible person:

Name and acronym of the participating RC: Materials- and Nanophysics Researcher Community, MATENA

The RC’s research represents the following key focus area of UH: 1. Maailman perusrakenne, materiaalit ja luonnontarvat – The basic structure, materials and natural resources of the physical world

Comments for selecting/not selecting the key focus area: Fundamental materials science research is essential to understand the atomic-scale origin of the macroscopic properties of materials. Furthermore, especially in the field of nanoscience it has become imperative to gain quantum-level structural knowledge to further develop novel materials.

The research groups forming MATENA have long-term tradition in fundamental and applied materials research that fits perfectly the aforementioned focus area of the UH in every aspect.

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 mission of MATENA is to carry out research in topical key issues of atomic-level materials physics at the highest international level and to offer first-quality environment for researcher training.

The research groups forming MATENA have long-term mutual collaboration in research and researcher training. The researchers of MATENA are responsible for the materials research and major part of the research infrastructure in the Department of Physics. They also heavily utilize large international research infrastructures.

The focus of research is to understand the atomic-scale origin of the macroscopic properties of materials and in the field of nanoscience to gain quantum-level structural knowledge to further develop novel materials. The research projects carried out by the experimentalists and computational scientists cover all major classes of materials underlying the current nanoscience and fusion research, e.g., nanostructured semiconductors and insulators, carbon nanotubes and graphene, metals, superconductors, biomaterials and complex multi-component liquids. An essential part of the research is the development of novel ion-beam and x-ray/synchrotron techniques and their interlinking via atomistic computational methods. The cornerstone of these activities is a close integration of research and educational efforts. The research is closely linked to collaboration with international large-scale facilities, such as ESRF, CERN and ITER.

During the period concerning this assessment, the scientific activities of MATENA have resulted in about 280 articles in high-ranking international journals and in 25 PhD theses.

In ion beam physics, the equipment acquired mostly with research project based funding has enabled creation and implementation of original and versatile research program in materials physics and nanophysics. The research has resulted in new information on various physical processes, development of better methods for preparation of nanomaterials and their characterization, and development of new
materials. The studies include thin film characterization and related novel method development, photonics applications in silica, properties of novel semiconducting materials (CERN/ISOLDE), first wall materials in fusion energy research (ITER).

Employing and developing multiscale computational simulation methods is one of MATENA’s working areas in ion beam physics. The simulation methods are essential to explain, predict and complement the various experimental activities. The methods utilized and developed by MATENA’s researchers range from sub-nanometer scale (density-functional theory and ab initio quantum chemistry methods) to scales of tens of nanometers (large-scale molecular dynamics) and even micrometers (Monte Carlo methods). Simulating time-dependent phenomena and non-equilibrium dynamics, including electronic excitations is likewise in the core of MATENA’s objectives. These phenomena define often the crucial optical and dielectric behavior of the novel materials and their technological applications (e.g. advanced solar cell materials for energy harvesting or electrode materials for energy storage).

MATENA’s scientists’ x-ray and synchrotron-radiation expertise is acknowledged worldwide. They have contributed significantly in the tremendous development of hard x-ray spectroscopies and scattering techniques that has been taking place due to the availability of large-scale synchrotron radiation laboratories. Especially the 3rd generation synchrotrons, namely the European Synchrotron Radiation Facility (ESRF, France), Spring-8 (Japan) and Advanced Photon Source (APS, USA) have been central in this development; with the anticipated advent of several new synchrotrons throughout the world (e.g. Soleil in France, Diamond in Great Britain, Petra-III in Germany, Max-IV in Sweden) boosting synchrotron-radiation experiments on a rapid pace, with MATENA’s contribution in a highly visible role. This trend will without doubt continue by large quantum leaps with the forthcoming x-ray free-electron lasers, which already have started to contribute to the advancement of our understanding of fundamental and applied physics and materials science. As a relevant example, the ESRF is about to undergo a major upgrade program that is enlisted by the European Strategy Forum on Research Infrastructures (ESFRI) as one of the most important European large-scale research infrastructures. ESRF upgrade flagship projects where MATENA’s scientists and collaborators play a key role, include several dedicated beamlines. UPBL6, for instance, has microfocus capabilities for high-energy-resolution spectroscopy and an emerging novel three-dimensional electron-excitation imaging technique. UPBL9a, as another example, will offer nanometric spatial and ms-range time resolution for small-angle x-ray scattering in relatively unexplored non-equilibrium dynamical systems. Examples range from colloidal plasma state to highly self-assembled biomimetic systems to complexities of flocking motions of microorganisms.

The significance of the research is reflected in many ways. MATENA has carried out pioneering work in Finland in use of ion beams and x-ray/synchrotron techniques in materials research. Its members are among the world-leading scientists in the development of ion beam analysis methods, computational study of ion-beam effects in materials, and development of new x-ray/synchrotron radiation analysis methods based on inelastic x-ray scattering. Fundamental understanding of the novel materials and phenomena obtained via the research carries clear scientific importance, both in terms of scientific impact and visibility. MATENA has a leading national role in the research accomplished at the large-scale facility ESRF and in the development of distributed (Grid) computing in Finland. The senior scientists are internationally recognized and they have several international evaluation tasks, positions of trust and are frequently used in organizing and advisory boards of international conferences as well as invited lecturers. In total, MATENA scientists have given about 65 keynote, plenary and invited talks at international conferences during 2005-2010.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

To highlight the scientific achievements of MATENA two examples are provided below.

- It was shown that electron irradiation of multiwalled carbon nanotubes can cause large pressure buildup within the nanotube cores that can plastically deform, extrude, and break solid materials that are encapsulated inside the core. It was further shown by atomistic simulations that the internal pressure inside nanotubes can reach values higher than 40 GPa. Nanotubes can thus be used as robust nanoscale jigs for extruding and deforming hard nanomaterials and for modifying their properties, as well as templates for the study of individual nanometer-sized crystals under high pressure. "Carbon Nanotubes as High-Pressure Cylinders and Nanoextruders" Science 312 (2006)1199.

- MATENA scientists have over the years systematically developed novel inelastic x-ray scattering techniques in the study of electronic structures in combination with related computational tools for structural interpretation. During the evaluation period 2005-2010 these synchrotron radiation based studies have yielded five first/last authored publications in Phys. Rev. Lett. -series. Out of these, the work on "Tetrahydrofuran Clathrate Hydrate Formation" (Phys. Rev. Lett. 103 (2009)218301) is a prime example because it combines very challenging synchrotron radiation experiments with state-of-the-art computations on an extremely relevant material candidate for hydrogen storage.

Ways to strengthen the focus and improve the quality of the RC’s research.

In the framework of MATENA, more efficient use of all the facilities and taking in account that the groups represent different specialties ensures the creation of a fruitful and effective research environment. This will promote a creative research environment where brilliant fundamental research ideas can be worked out.

Expanding of the national and international scientific collaboration is essential in keeping and improving the high standards in research and doctoral training.

Frequent updates of both the experimental and computational infrastructure are essential for maintaining the high quality of the research. Also participation in the international large scale facilities (ESRF, MAX IV) is important for both the experimental work and training of students.

2 PRACTICES 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.

Postgraduate students are selected by applications only. During the time period 2005-2010 the recruitment within MATENA has become fully global; in addition to several students from EU countries, recent recruitments include citizens from as far as Bangladesh and Uzbekistan. Each student has a responsible supervisor appointed among the professors and senior researchers. A detailed study and research plan is required in the beginning of the postgraduate studies. The progress of studies and research work is followed continuously. The progress monitoring is coordinated with the University salary system (YPJ), such that the publications, study progress and other merits affect the salary of students in a coherent way. Young researchers have important roles in all the projects of MATENA. The research groups include both PhD students and young doctorates. The postdocs participate closely in supervision of the students as immediate supervisors.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Doctoral training in MATENA is connected to two national graduate schools, namely to those in materials physics and nanoscience. The basis of the training comprises the graduate and postgraduate level courses in the curriculum of the Department of Physics, which the senior research personnel of MATENA is responsible for. The courses are in solid state physics, materials research, surface physics, ion beam physics, synchrotron radiation physics, and computational physics. They form the major study lines in materials physics and computational physics.

Doctoral training has been strengthened by initiating the nanoscience teaching curriculum in the Helsinki region. A set of courses "Nanoscience I-IV" that cover the whole range of nanoscience, from hard matter nanocrystals to using living cell membranes and viruses as nanoscience tools. This course complex, which has as lecturers the best nanoscience experts in Finland, is coordinated by MATENA.

The post-graduate curriculum at the UH is further strengthened by the numerous international summer schools organized either within the Graduate Schools and by our international collaborators (e.g. HERCULES organized by ESRF). Almost without exception all the PhD candidates have at least one international summer school in their study plan.

The success and propriety of doctoral training is evidenced by the eligibility of the fresh doctorates. During the postdoc period within MATENA the doctorates (both domestic and foreign) obtain experience in PhD student supervision, skills in teaching, writing of proposals, reporting, and oral presentations which are constantly followed and advised.

It is a practice that after the PhD exam many of the MATENA researchers continue in foreign laboratories, which is also due to the visibility of MATENA. The main fraction of the postdoctoral positions is obtained via personal contacts of the supervisors. PhD’s graduated from MATENA during 2005-2010 have received postdoctoral positions in top research universities and synchrotron facilities across Europe and in the USA. Efficient postdoctoral education is evidenced by the high number of docentships related to the research in MATENA. The broad contacts to the international community provide excellent possibilities for young scientists to advance their research careers. They have the possibility to gain experience by working in international research groups at foreign laboratories.

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

A clear strength of MATENA is the qualified personnel providing appropriate supervision for the young scientists from the outset of their career. The excellent international contacts assure possibilities for building up strong international research careers.

A major challenge is to be able to attract high quality students also in the future, but the international hiring practices are a good tool to minimize the effects of this problem.

### 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).**

The versatile research program of MATENA and its development is tightly connected to the physics of the 21st century. MATENA has long traditions in promoting its scientific contents and results among the physics community as well as among the general public. This is done by participating in physics conferences and meetings, and acting as members in scientific societies and other professional bodies, such as the Finnish and European Physical Society. Public understanding is being promoted through
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

organizing visits and open days to the laboratories. Key results of the research and general progress in nanoscience and energy production related materials research are regularly included in the continued education of school teachers, and MATENA members are participating in school outreach activities in schools via the LUMA-centre activities and outreach resource Centrum F2k of the Department.

MATENA has a leading role in development of Grid and other distributed computing in Finland. A member of MATENA coordinated the Materials Grid network that formed in 2004-2006 the first sustained homogeneous Grid computing network in the Nordic countries. It also formed the role model for the new national Finnish Grid Infrastructure (FGI) currently being installed as a national distributed computing system serving all fields of science.

MATENA members have also had a driving role in physics outreach activities directed at the general public, via high-profile activities such as physics demonstrations carried out in the main hall of the central railway station in Helsinki. MATENA scientists regularly participate as speakers in the biggest science outreach event in Finland, namely "Tieteen-päivät". During the evaluation period the MATENA researchers have also given tens of radio interviews as well as shown as experts in the numerous articles in the newspapers and popular magazines.

The topics studied by MATENA have also high societal relevance both globally and in Finland. The MATENA scientists studying plasma-material interactions in particle accelerator components (Compact linear collider, CLIC) and fusion reactor development (ITER) are recognized to be among the leading materials physics experts in the development of these machines that are among the most complex devices ever developed by man. Synchrotron radiation research at ESRF is highly multidisciplinary and attracts broad general interest. MATENA scientists have utilized this visibility to promote especially younger people’s interest in science.

Participation in such prominent international projects and dense networks provide unique potential for possible scientific breakthroughs. The constant supply of highly trained graduate students with different degrees is of an importance for domestic high tech companies. The deep collaboration with leading universities and research institutes combined with our versatile basic research approach aids in fulfilling the needs of the future society.

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

The societal impact of MATENA could be promoted by keeping even closer contacts with MATENA alumni. This is now put underway in line with the systematic alumni activities recently initiated by the faculty of science. Also developing of new research areas that would meet the future needs of science and the society could strengthen the impact of MATENA.

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

The MATENA research collaborations are based both on domestic joint research projects with researches in Finnish universities and on the effective use of international large-scale facilities and the accompanied international collaboration. A large fraction of the graduate students come from other universities in Finland and abroad. Two of the senior scientists in MATENA are foreign citizens. Several doctoral students supervised by MATENA senior scientists are working full-time in collaborating groups abroad, in research institutions such as CERN in Switzerland, the SCK-CEN nuclear research centre in
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Belgium, Oak Ridge National Laboratory in the USA and ESRF in Grenoble, France. The doctoral students in Helsinki participate in international summer schools and training courses organized by synchrotron facilities, graduate schools, and research networks (COST actions, Nordforsk funded Nordic network of soft matter physics etc). The Department of Physics also gains visiting doctoral students via these networks (e.g. COST short term scientific missions).

The researcher mobility has been promoted not only through scientific visits but also via scientists of MATENA working in several major international facilities on long term basis. These have had a clear effect as improved international visibility of the University of Helsinki.

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

In addition to the international large-scale facility-based activities the MATENA activities strengthen the research carried out at campuses of the University of Helsinki (UH) (Kumpula, Viikki and Meilahti) in the fields of materials sciences and nanosciences. Also the prominent research infrastructure of UH in these fields is effectively utilized. The activities secure and strengthen especially the basic research in materials physics and nanophysics, and the challenge is to facilitate even more active international collaboration.

The difficult challenges in the future are to be able to recruit the best of the young scientists to the research teams, both from Finland and abroad as well as to be able to assure attractive career development for the most qualified young scientists.

The action plan for the future is to utilize the international large scale facilities even more effectively, not only through increased initiated scientific projects, but also by increased long-term scientific visits and promoting the number of permanent staff members in them.

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 accessible equipment provides versatile and complementary methods for the study, development, and characterization of materials. Material characterization forms an essential part of the research and within MATENA several basic characterization tools are available.

The accelerator facilities used for materials characterization and modification and thin film production consist of a 5 MV tandem accelerator with five beam lines, a 500 kV accelerator with two beam lines, a 30 kV accelerator, and a 10 kV ion gun. For example, all conventional ion-beam based characterization techniques are readily available. MATENA possesses a unique facility that is capable of producing virtually any kind of nanostructured surfaces and nanocrystalline thin films by cluster deposition. It is of great interest for both understanding of fundamental physics of matter at nano- and mesoscopic scales, and development of new nanodevices offering new functionalities not easily attainable via conventional technology. Ultra high vacuum AFM/STM, AES and LEED are available for in-situ surface analysis. A variable temperature (10 mK up to RT) electrical characterization system has recently been installed in a shielded room.

A MATENA team has decades-long history in experimental x-ray science. The x-ray equipment include small and wide angle scattering setups and a new x-ray microtomography equipment for structural
studies of materials from nanometer to micrometer scale. An ongoing project is to equip the
tomography instrument with an additional micro-focus x-ray tube with focusing optics and a
supplementary two-dimensional photon-counting silicon pixel x-ray detector (PILATUS 1M) enabling a
simultaneous diffraction and/or small-angle scattering detection from the same sample. There are only
a small number of x-ray microtomography systems in Finland and with this spatial resolution and
versatility the instrument is unique.

Dedicated computer resources are available for simulations and data analysis. These include the
professionally maintained set of compute, disk, and web servers of the Department of Physics and the
MGrid and FGI cluster infrastructures. MATENA scientists also heavily utilize the supercomputers of the
national IT centre for science CSC, where they are among the top-ten users of the CPU capacity.
Computer simulation methods from atomic and electronic level to mesoscopic scales complete the
experimental work and provide fundamental understanding of the interaction processes, and thus aid
the development of new materials.

All the members of MATENA participate in the teaching at the Department of Physics. They are
responsible for the materials physics curriculum of the Department. Thus the teaching and research are
closely interlinked. All the MATENA principal investigators give lectures regularly. Experimental physics
courses include demonstrations and training with the laboratory equipment. This is important training
for experiments at synchrotron facilities.

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

The strength of MATENA has been largely based on the facilities securing consistent purposeful long-
term basic research that has been the most influential part of MATENA activities in the past, both
research- and doctoral training-wise.

One of the main challenges is to attract external funding for the needs of experimental research as well
as for continuous development of the equipment in the long run. It is extremely important to be able to
maintain the present level of supporting personnel in the future.

By now the basic research has been done mostly on the resources obtained from the Academy of
Finland, but funding from other sources must be also looked into.

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.

In terms of the organizational aspects MATENA is efficiently managed and coordinated through the
existing infrastructure, namely MATENA is essentially the Division of Materials Physics in the
Department of Physics.

The teams and team leaders have differing backgrounds and the skills and their expertise complement
each other well. The experimental PI’s (Keinonen, Räisänen, Hämäläinen, Serimaa) carry out
experimental research with methods that can be used to modify and analyze the same kinds of samples.
The simulation PI’s (Nordlund, Kuronen) do atomic-level computer simulations of the same kinds of
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

materials that are studied experimentally, and also have the capability to predict the experimental signal for most of the experimental analysis methods from atomic data. Thus the simulation can, and regularly are, compared to experiments carried out within MATENA.

The leadership in MATENA is based on the collaboration and consensus of the team leaders. The decisions of the important issues are prepared within a board consisting of the group leaders. The group has official meetings several times a year and other meetings are organized on demand basis. In addition, topical meetings on different research areas are held and these meetings collect the researchers interested of a certain topical project. Progress of the recent research and plans for the future period are discussed in these meetings.

For executing tasks related to the technological aspects of the facilities, MATENA has two technical managers. MATENA is able to provide good basic technical services and support for all research groups. A substantial fraction of the experimental research equipment has been designed and manufactured by the technical personnel.

- RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes.

The MATENA teams are known as top level research groups having excellent international networks. Their facilities are of high level and top in Finland. Tightly managed collaboration between these groups has allowed efficient use of all facilities. This, and taking into account that the groups represent different areas of specialties has ensured the creation of a fruitful and effective research environment. The strategic plan is to strengthen contacts to leading international groups, and to thereby gain access to their facilities and knowledge.

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: 561000
- 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: 440000
- 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: 630000
- 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:

- 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: Magnus Ehrnrooth, Vaisala, Svenskatekniskvetenskapssakademien, Finnish Cultural Foundation, Nordic Forest Research Co-operation Committee (SNS)
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

- total amount of funding (in euros) from the above-mentioned foundations: 160000

- 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: SCK-CEN, Belgium
  - total amount of funding (in euros) from the above-mentioned funding organizations: 200000

- 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: Helsinki Institute of Physics,
  - Research Funds of the University of Helsinki
  - total amount of funding (in euros) from the above-mentioned funding organizations: 525000

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 emphasis of in-house research and doctoral training will be on nanosciences, e.g., employing the cluster deposition facility and the characterization possibilities constructed around it. The new cryogen-free dilution refrigerator facility intended for transport measurements of the prepared nanostructures will be utilized also in studies related to properties of magnetic nanoclusters. Accelerator Mass Spectrometry (AMS) will be developed towards increased use in aerosol science which will increase the synergy within the Department and the Faculty of Science. The research dealing with in-situ irradiation effects of materials will be strongly based on international collaboration related to the upgrading of the CERN/CMS tracker and tests of the BepiColombo space mission particle detectors.

  Experimental studies on the structural properties of materials both with micron (cell-size) and sub-nanometer (atomic-size) scales will be carried out in multidisciplinary projects. In this field, connections to existing and new synchrotron and free electron laser facilities like ESRF, MAX IV, and X-FEL will be strengthened.

  The usage and development of the computational simulation methodologies will be further strengthened, and extended both towards larger scales and towards more advanced levels of theory. The computational studies of plasma-material interactions in fusion reactors and vacuum arcs, already deeply immersed in the international activities for the development of ITER and CLIC, will be broadened to be relevant for space research and industrial applications.

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

The principal investigators commented the material compiled by Räisänen, who was the main author of the text.
1 Analysis of publications

<table>
<thead>
<tr>
<th>Publication type</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total Count 2005 - 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 Refereed journal article</td>
<td>71</td>
<td>61</td>
<td>76</td>
<td>59</td>
<td>56</td>
<td>51</td>
<td>374</td>
</tr>
<tr>
<td>A2 Review in scientific journal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>A3 Contribution to book/other compilations (refereed)</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>A4 Article in conference publication (refereed)</td>
<td>13</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>57</td>
</tr>
<tr>
<td>B1 Unrefereed journal article</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>B2 Contribution to book/other compilations (non-refereed)</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>B3 Unrefereed article in conference proceedings</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>D1 Article in professional journal</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>D2 Article in professional hand or guide book or in a professional data system, or text book material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>D4 Published development or research report</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>E1 Popular article, newspaper article</td>
<td>4</td>
<td>1</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>H1 Patents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
2 Listing of publications

A1 Refereed journal article

2005


Kotakoski, J, Nordlund, K 2006, 'Binding a carbon nanotube to the Si(100) surface using ion irradiation—an atomistic simulation study', New Journal of Physics, vol 8, pp. 115.


Kotakoski, J, Nordlund, K 2006, 'Binding a carbon nanotube to the Si(100) surface using ion irradiation—an atomistic simulation study', New Journal of Physics, vol 8, pp. 115.


Kotakoski, J, Nordlund, K 2006, 'Binding a carbon nanotube to the Si(100) surface using ion irradiation—an atomistic simulation study', New Journal of Physics, vol 8, pp. 115.


Kotakoski, J, Nordlund, K 2006, 'Binding a carbon nanotube to the Si(100) surface using ion irradiation—an atomistic simulation study', New Journal of Physics, vol 8, pp. 115.


Kotakoski, J, Nordlund, K 2006, 'Binding a carbon nanotube to the Si(100) surface using ion irradiation—an atomistic simulation study', New Journal of Physics, vol 8, pp. 115.


2007


MATENA/Räisänen


2008


MATENA/Räisänen


2009


2010


Hämäläinen, J, Hatanpää, T, Puukilainen, E, Costelle, L, Ritvi, T, Ritala, M, Leskelä, M 2010, ['(MeCp)Ir(CHD) and molecular oxygen as precursors in atomic layer deposition of iridium', Journal of Materials Chemistry, vol 20, no. 36, pp. 7669-7675.}
MATENA/Räisänen


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

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010


A2 Review in scientific journal

2008


2010


A3 Contribution to book/other compilations (refereed)

2005


2006


2008


2009


Räisänen, J 2009, 'Nanomaterials science with radioactive ion beams', in R. Hellborg, H. Whittow, Y. Zhang (eds), Ion beams in nanoscience and technology, Springer-Verlag, pp. 219-235.

2010


Article in conference publication (refereed)

2005


2006


MATENA/Räisänen


Kotakrski, J, Nordlund, K 2006, Ion irradiation-induced welding of a carbon nanotube to a Si (100) surface', in Materials Research Society symposia proceedings.


2007


Fiister, TT, Seldier, GT, Gross, JD, Reihr, JJ, Soirinen, JA 2007, 'Measurement of the full XAFS spectrum of MgO using nonresonant inelastic x-ray scattering', in X-ray absorption fine structure--XAFS13, pp. 156-158.


2008


Nordlund, K 2008, 'Molecular-dynamics for ion beam analysis', in Eighteenth International Conference on Ion Beam Analysis , pp. 1886-1891.
MATENA/Rälsänen


2009


2010


B1 Unrefereed journal article
2006

2007

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

2006

2008
Björkas, C, Vörtler, K, Nordlund, K, Terentyev, D, Malerba, L 2008, 'Molekydynamiska simuleringar av strålningsskador i FeCr', Reflexer, Yliopistopaino, Helsingfors, pp. 70-76.

B3 Unrefered article in conference proceedings

2005

2007

2009

2010

D1 Article in professional journal

2005

2006
2007

2009

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

2008

D4 Published development or research report

2006

E1 Popular article, newspaper article

2005

2006

2007

2008

Hämäläinen, K 2010, ’Miksi tina räjähti kylmästä?’, Helsingin Sanomat.

H1 Patents

1 Analysis of activities 2005-2010

<table>
<thead>
<tr>
<th>Activity type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor or co-supervisor of doctoral thesis</td>
<td>33</td>
</tr>
<tr>
<td>Prizes and awards</td>
<td>4</td>
</tr>
<tr>
<td>Editor of research journal</td>
<td>129</td>
</tr>
<tr>
<td>Peer review of manuscripts</td>
<td>36</td>
</tr>
<tr>
<td>Assessment of candidates for academic posts</td>
<td>3</td>
</tr>
<tr>
<td>Membership or other role in review committee</td>
<td>3</td>
</tr>
<tr>
<td>Membership or other role in research network</td>
<td>2</td>
</tr>
<tr>
<td>Membership or other role in national/international committee, council, board</td>
<td>133</td>
</tr>
<tr>
<td>Membership or other role in public Finnish or international organization</td>
<td>19</td>
</tr>
<tr>
<td>Membership or other role of body in private company/organisation</td>
<td>7</td>
</tr>
<tr>
<td>Participation in interview for written media</td>
<td>91</td>
</tr>
<tr>
<td>Participation in radio programme</td>
<td>8</td>
</tr>
<tr>
<td>Participation in TV programme</td>
<td>8</td>
</tr>
</tbody>
</table>
2 Listing of activities 2005-2010

**Supervisor or co-supervisor of doctoral thesis**

<table>
<thead>
<tr>
<th>Name</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keijo Hämäläinen</td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2006 → …, Finland</td>
</tr>
<tr>
<td></td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2007, Finland</td>
</tr>
<tr>
<td></td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2007, Finland</td>
</tr>
<tr>
<td></td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2007, Finland</td>
</tr>
<tr>
<td></td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2007 → …, Finland</td>
</tr>
<tr>
<td></td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2008 → …, Finland</td>
</tr>
<tr>
<td></td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2009 → …, Finland</td>
</tr>
<tr>
<td></td>
<td>Supervision of PhD thesis, Keijo Hämäläinen, 2010 → …, Finland</td>
</tr>
<tr>
<td></td>
<td>Co-supervision of PhD thesis, Kai Nordlund, 2005 → 2007, Finland</td>
</tr>
<tr>
<td>Jyrki Räisänen</td>
<td>Thesis supervision, Jyrki Räisänen, 09.03.2007, Finland</td>
</tr>
<tr>
<td></td>
<td>Thesis supervision, Jyrki Räisänen, 09.2007 → 08.2011, Finland</td>
</tr>
<tr>
<td></td>
<td>Thesis supervision, Jyrki Räisänen, 02.2009 → 12.2012, Finland</td>
</tr>
<tr>
<td></td>
<td>Thesis supervision, Jyrki Räisänen, 07.05.2010, Finland</td>
</tr>
<tr>
<td></td>
<td>Thesis supervision, Jyrki Räisänen, 20.12.2010, Finland</td>
</tr>
<tr>
<td></td>
<td>Thesis supervision, Jyrki Räisänen, 18.02.2010, Finland</td>
</tr>
<tr>
<td>Ritva Serimaa</td>
<td>PhD thesis supervision, Ritva Serimaa, 2006</td>
</tr>
<tr>
<td></td>
<td>PhD thesis supervision, Ritva Serimaa, 2007 → …</td>
</tr>
<tr>
<td></td>
<td>PhD thesis supervision, Ritva Serimaa, 2007</td>
</tr>
<tr>
<td></td>
<td>PhD thesis supervision, Ritva Serimaa, 2007</td>
</tr>
<tr>
<td></td>
<td>PhD thesis supervision, Ritva Serimaa, 2007</td>
</tr>
<tr>
<td></td>
<td>PhD thesis supervision, Ritva Serimaa, 2008</td>
</tr>
<tr>
<td></td>
<td>PhD thesis supervision, Ritva Serimaa, 2008</td>
</tr>
<tr>
<td></td>
<td>PhD thesis supervision, Ritva Serimaa, 2008</td>
</tr>
</tbody>
</table>
Prizes and awards
Keijo Hämäläinen,
Teacher of the Year 2009, Keijo Hämäläinen, 2009
Annual Communication Award 2010, Keijo Hämäläinen, 2010
Kai Nordlund,
Magnus Ehrnrooth Prize in Physics, Kai Nordlund, 2007, Finland
Ritva Serimaa,
Finnish Academy of Science and letters, membership, Ritva Serimaa, 2010 → ..., Finland

Editor of research journal
Flyura Djurabekova,
Journal of Nanoscience and Nanotechnology, Flyura Djurabekova, 01.01.2008 → 31.12.2008, United States
Nuclear Inst. and Methods in Physics Research, B, Flyura Djurabekova, 01.01.2008 → 31.12.2008, Netherlands
Keijo Hämäläinen,
Analytical Chemistry, Keijo Hämäläinen, 01.01.2005 → 31.12.2005
Arkhimedes, member of the Delegation, Keijo Hämäläinen, 01.01.2005 → 31.12.2005, Finland
Arkhimedes, member of the delegation, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, Finland
Physica Scripta, Keijo Hämäläinen, 01.01.2006 → 31.12.2006
Physical Review A, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, United States
Physical Review B, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, United States
Physical Review Letters, Keijo Hämäläinen, 01.01.2008 → 31.12.2006, United States
Physics in Medicine and Biology, Keijo Hämäläinen, 01.01.2008 → 31.12.2006
Arkhimedes, member of the editorial council, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, Finland
Nature, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, United Kingdom
Physical Review B, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, United States
Yliopistolehti, member of the editorial council, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, Finland
Analytical Chemistry, Keijo Hämäläinen, 01.01.2008 → 31.12.2008
Arkhimedes, member of the editorial council, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, Finland
Physical Review Letters, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, United States
Yliopistolehti, member of the editorial council, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, Finland
Juhani Keinonen,
MATENA/Räisänen

Nanotechnology, Juhani Keinonen, 01.01.2006 → 31.12.2006
Journal of Chemical Physics, Juhani Keinonen, 01.01.2007 → 31.12.2007
Nanotechnology, Juhani Keinonen, 01.01.2007 → 31.12.2007
New Journal of Physics, Juhani Keinonen, 01.01.2007 → 31.12.2007
Nuclear Instruments and Methods in Physics Research, Section B, Juhani Keinonen, 01.01.2007 → 31.12.2007
Nanotechnology, Juhani Keinonen, 01.01.2008 → 31.12.2008

Kai Nordlund

Carbon, Kai Nordlund, 01.01.2005 → 31.12.2005
Computational Materials Science, Kai Nordlund, 01.01.2005 → 31.12.2005, Netherlands
Fusion Science and Technology, Kai Nordlund, 01.01.2005 → 31.12.2005, United States
Journal of Applied Physics, Kai Nordlund, 01.01.2005 → 31.12.2005, United States
Science, Kai Nordlund, 01.01.2005 → 31.12.2005, United States
Vacuum, Kai Nordlund, 01.01.2005 → 31.12.2005, Netherlands
Carbon, Kai Nordlund, 01.01.2006 → 31.12.2006, Netherlands
European Physical Journal D, Kai Nordlund, 01.01.2006 → 31.12.2006, France
European Letters, Kai Nordlund, 01.01.2006 → 31.12.2006, France
Journal of Applied Physics, Kai Nordlund, 01.01.2006 → 31.12.2006, United States
Nature, Kai Nordlund, 01.01.2006 → 31.12.2006, United Kingdom
Nuclear Instruments and Methods B, Kai Nordlund, 01.01.2006 → 31.12.2006, Netherlands
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

MATENA/Räisänen

Nuclear Instruments and Methods B, Kai Nordlund, 01.01.2006 → 31.12.2006, Netherlands
Physical Review B, Kai Nordlund, 01.01.2006 → 31.12.2006, United States
Physical Review Letters, Kai Nordlund, 01.01.2006 → 31.12.2006, United States
Radiation Effects and Defects in Solids, Kai Nordlund, 01.01.2006 → 31.12.2006, Germany
Physica status solidi, Kai Nordlund, 01.01.2006 → 31.12.2006, Italy
CALPHAD, Kai Nordlund, 04.04.2007 → 31.12.2007, Netherlands
Carbon, Kai Nordlund, 25.06.2007 → 31.12.2007, Netherlands
Europhysics Letters, Kai Nordlund, 10.09.2007 → 31.12.2007, France
Journal of Applied Physics, Kai Nordlund, 01.01.2007 → 31.12.2007, United States
Journal of Physical Chemistry, Kai Nordlund, 01.01.2007 → 31.12.2007, United States
Nature, Kai Nordlund, 01.01.2007 → 31.12.2007, United Kingdom
New Journal of Physics, Kai Nordlund, 01.01.2007 → 31.12.2007, United Kingdom
Nuclear Instruments and Methods in Physics Research B, Kai Nordlund, 01.01.2007 → 31.12.2007, Netherlands
Nuclear Instruments and Methods in Physics Research B, Kai Nordlund, 01.01.2007 → 31.12.2007, Netherlands
Philosophical Magazine A, Kai Nordlund, 01.01.2007 → 31.12.2007, United Kingdom
Physical Review B, Kai Nordlund, 01.01.2007 → 31.12.2007, United States
Physical Review Letters, Kai Nordlund, 01.01.2007 → 31.12.2007, United States
Science, Kai Nordlund, 03.12.2007 → 31.12.2007, United States
Molecular Simulations, Kai Nordlund, 01.01.2008 → 31.12.2008, Netherlands

Vesa Palonen ,

Marko Peura ,

Eero Rauhala ,

Ritva Serimaa ,
Biomacromolecules, Ritva Serimaa, 01.01.2005 → 31.12.2005, United States
J. of Polymer Science Part B Polymer Physics, Ritva Serimaa, 01.01.2005 → 31.12.2005, United States
Macromolecules, Ritva Serimaa, 01.01.2005 → 31.12.2005, United States
Trees, Ritva Serimaa, 01.01.2005 → 31.12.2005, United States
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

MATENA/Räisänen

Biomacromolecules, Ritva Serimaa, 01.01.2006 → 31.12.2006, United States
Holzforschung, Ritva Serimaa, 01.01.2006 → 31.12.2006, Germany
Nanotechnology, Ritva Serimaa, 01.01.2006 → 31.12.2006, United States
Physics in Medicine and Biology, Ritva Serimaa, 01.01.2006 → 31.12.2006, United Kingdom
Planta, Ritva Serimaa, 01.01.2008 → 31.12.2006, Germany
The Canadian Journal of Chemical Engineering, Ritva Serimaa, 01.01.2006 → 31.12.2006, Canada
Biomacromolecules, Ritva Serimaa, 01.01.2007 → 31.12.2007, United States
J. Phys.: Condens. Matter, Ritva Serimaa, 01.01.2007 → 31.12.2007, United States
Journal of Biomaterials and Bioenergy, Ritva Serimaa, 01.01.2007 → 31.12.2007, United States
Nanotechnology, Ritva Serimaa, 01.01.2007 → 31.12.2007, United States
Physics in Medicine and Biology, Ritva Serimaa, 01.01.2007 → 31.12.2007, United Kingdom
Biointerphases, Ritva Serimaa, 01.01.2008 → 31.12.2008
Holzforschung, Ritva Serimaa, 01.01.2008 → 31.12.2008
PLOS one, Ritva Serimaa, 01.01.2008 → 31.12.2008

Aleksi Soininen,

Europhysics Letters, Aleksi Soininen, 01.01.2005 → 31.12.2005
Physica Status Solidi (B), Aleksi Soininen, 01.01.2005 → 31.12.2005
Europhysics Letters, Aleksi Soininen, 01.01.2006 → 31.12.2006

Peer review of manuscripts

Mikko Oskari Hakala,

Physical Review B, Mikko Oskari Hakala, 01.01.2004 → ..., United States
Physical Review Letters, Mikko Oskari Hakala, 01.01.2004 → ..., United States
Acta Crystallographica Section A, Mikko Oskari Hakala, 01.01.2006 → ..., Spain
Journal of Physics D: Applied Physics, Mikko Oskari Hakala, 01.01.2006 → ..., United Kingdom
Physica Status Solidi, Mikko Oskari Hakala, 01.01.2008 → ..., Germany

Simo Huotari,

Referee, Physical Review B, Simo Huotari, 2005 → ..., United States
Referee, Physical Review A, Simo Huotari, 2007 → ..., United States
Referee, Journal of Physics: Condensed Matter, Simo Huotari, 2008 → ..., United States
Referee, Physical Review Letters, Simo Huotari, 2008 → ..., United States
Referee, Journal of Synchrotron Radiation, Simo Huotari, 2009 → ..., United Kingdom
Referee, EPL, Simo Huotari, 2010 → ...

Jyrki Räisänen,

Referee, Jyrki Räisänen, 1990 → ...
Incessant referee, Jyrki Räisänen, 1997 → ..., United States
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

MATENA/Räisänen

Incessant referee, Jyrki Räisänen, 1997 → ..., United States
Referee, Jyrki Räisänen, 2000 → ...
Referee, Jyrki Räisänen, 2005 → ...
Referee, Jyrki Räisänen, 2005 → ...
Referee, Jyrki Räisänen, 2005 → ...
Referee, Jyrki Räisänen, 2005 → ...
Referee, Jyrki Räisänen, 2006 → ...
Referee, Jyrki Räisänen, 2007
Referee, Jyrki Räisänen, 2007 → 2008
Incessant referee, Jyrki Räisänen, 2008 → ...
Referee, Jyrki Räisänen, 2008
Incessant referee, Jyrki Räisänen, 2009 → ..., United States
Referee, Jyrki Räisänen, 2009
Referee, Jyrki Räisänen, 15.12.2010
Referee, Jyrki Räisänen, 2010

Ritva Serimaa

Biomacromolecules, Ritva Serimaa, 2010 → ...
Holzforschung, Ritva Serimaa, 2010 → ...
Journal of Physics, Conference series, Ritva Serimaa, 2010 → ...
Materials chemistry and physics, Ritva Serimaa, 2010 → ...
New Journal of Physics, Ritva Serimaa, 2010 → ...
The Open Natural Products Journal, Ritva Serimaa, 2010 → ...

Assessment of candidates for academic posts

Keijo Hämäläinen
Assessment of professorship candidate, Keijo Hämäläinen, 2010, United States
Assessment of professorship candidates, Keijo Hämäläinen, 2010, Finland

Jyrki Räisänen
Referee for a professorship, Jyrki Räisänen, 2010, Finland

Membership or other role in review committee

Jyrki Räisänen
Member, Jyrki Räisänen, 2009 → ..., Germany
Member, Jyrki Räisänen, 2010 → ..., Hungary

Ritva Serimaa
Tutkimushankkeen arvioija, The Vienna University of Technology, Ritva Serimaa, 2010

Membership or other role in research network

Ritva Serimaa
Nordic network of soft matter physics, Ritva Serimaa, 2009 → 2013, Norway

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

**Carolina Maria Isabel Björkas**

10th Workshop on Modelling of FeCr, member of the organizing committee, Carolina Maria Isabel Björkas, 01.01.2006 → 31.12.2006, Finland

De finlandssvenska Fysikadgarna 20.-22.10.2007, medlem av organisationskommittén, Carolina Maria Isabel Björkas, 01.01.2007 → 31.12.2007, Finland

Fysikersamfundet i Finland Suomen fysikkkojen seura r.f., Carolina Maria Isabel Björkas, 01.01.2007 → 31.12.2007, Finland

Fysikersamfundet i Finland Suomen fysikkkojen seura r.f., Carolina Maria Isabel Björkas, 01.01.2008 → 31.12.2008, Finland

**Keijo Hämäläinen**

Member of the Commission on Charge, Spin and Momentum Densities, Keijo Hämäläinen, 1999 → ...

Chairman of the National Crystallography Committee, Keijo Hämäläinen, 2004 → ...

Annual Meeting of the Finnish Physical Society, member of the Programme Committee, Keijo Hämäläinen, 01.01.2005 → 31.12.2005, Finland

ECA Council, delegate of Finland, Keijo Hämäläinen, 01.01.2005 → 31.12.2005

EPS Council, delegate of Finland, Keijo Hämäläinen, 01.01.2005 → 31.12.2005

ESRF, Beamline ID16 review panel member, Keijo Hämäläinen, 01.01.2005 → 31.12.2005, France

EU ESRFI -asiantuntijaryhmä, jäsen, Keijo Hämäläinen, 01.01.2005 → 31.12.2005

IUCR General Assembly, delegate of Finland, Keijo Hämäläinen, 01.01.2005 → 31.12.2005

IUPAP General Assembly, delegate of Finland, Keijo Hämäläinen, 01.01.2005 → 31.12.2005

Kristallografian kansallinen komitea, Keijo Hämäläinen, 01.01.2005 → 31.12.2005

Suomen Akatemia, tutkimusinfrastruktuurien laaja asiantuntijaryhmä, jäsen, Keijo Hämäläinen, 01.01.2005 → 31.12.2005


Suomen Fysikkosouura - Finnish Physical Society, Keijo Hämäläinen, 18.03.2005 → 31.12.2006, Finland

U.S. Department of Energy, review panel member for Stanford Synchrotron Radiation Laboratory and Advanced Light Source (Berkeley), Keijo Hämäläinen, 01.01.2005 → 31.12.2005, United States

ESRF evaluation panel, Keijo Hämäläinen, 01.01.2005 → 31.12.2006, France

EU ESRFI expert group, member, Keijo Hämäläinen, 01.01.2006 → 31.12.2006

European Physical Society / Executive Committee, Keijo Hämäläinen, 01.04.2006 → 31.03.2008

European Synchrotron Radiation Facility, sieteellisen asiantuntijaneuvoston jäsen, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, France

Kristallografian kansallinen komitea, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, Finland

MAX IV synchrotron, scientific evaluation panel, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, Sweden

Member of the ESRF Science Advisory Council, Keijo Hämäläinen, 2006 → 2008, France


SOLEIL synchrotron evaluation panel, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, France

Sagamore XV Conference on Electron, Charge, Spin and Momentum Densities, Warwickshire, UK, 13.-18.8.2006, Member of the Scientific Programme Committee, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, United Kingdom

Suomen Akatemia, tutkimusinfrastruktuurien laaja asiantuntijaryhmä, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, Finland

The 1st European Conference on Science, Art and Technology in the Service of Man, 7.-9.9.2006, Helsinki, Finland, Member of the Advisory Committee, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, Finland

6th International Conference on Inelastic X-ray Scattering 7.-11.5.2007, Awaji, Japan, member of the Scientific Program Committee, Keijo Hämäläinen, 01.01.2007 → 31.12.2007

European Synchrotron Radiation Facility, member of the scientific council, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, France

Executive Committee of the European Physical Society (EPS), Keijo Hämäläinen, 01.01.2007 → 31.12.2007
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

MATENA/Räisänen

IUCr, Charge, Spin and Momentum density Commission, member, Keijo Hämäläinen, 01.01.2007 → 31.12.2007
IUCr:n (International Union of Crystallography) Suomen kansallinen komitea, chairman, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, Finland

Physics Days 2007, Tallinn 15.-17.3.2007, organizing committee, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, Finland

SOLEIL synchrotron evaluation panel, Keijo Hämäläinen, 30.01.2007 → 31.01.2007, France

SOLEIL, member of the evaluation group for beam time, Keijo Hämäläinen, 01.01.2007 → 31.12.2007

Suomalaisen Tiedeakatemian 100-vuotisjuhlien symposium "Energy Issues - Challenge for Physics" 31.8.2007, program organizing committee, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, Finland

Suomen Fysiikkoseura - Finnish Physical Society, member of the board, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, Finland

ECA (European Crystallographic Association), councilin kansallinen delegaatti, Keijo Hämäläinen, 01.01.2008 → 31.12.2008

EPSRC (Engineering and Physical Science Research Council), referee for applications, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, United Kingdom

European Synchrotron Radiation Facility, member of the scientific council, Keijo Hämäläinen, 01.01.2008 → 31.12.2008

Executive Committee of the European Physical Society (EPS), Keijo Hämäläinen, 01.01.2008 → 31.12.2008


NSF (National Science Foundation), referee for applications, Keijo Hämäläinen, 01.01.2008 → 31.12.2008

SOLEIL synchrotron evaluation panel, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, France

Stanford Synchrotron Radiation Laboratory, referee for applications, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, United States

Suomen Fysiikkoseura - Finnish Physical Society, member of the board, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, Finland

Member of the ELISA Council, Keijo Hämäläinen, 2009 → …

Secretary of the Finnish Academy of Science and Letters, Physics and Astronomy Group, Keijo Hämäläinen, 2009 → …

Vice-chair of the ESRF Science Advisory Council, Keijo Hämäläinen, 2009 → …, France

Member of the International Program Committee, XXII IUCr Congress Madrid 2011, Keijo Hämäläinen, 2010 → 2011

Vice-member of the NORDITA Board, Keijo Hämäläinen, 2010 → …, Sweden

Juhani Keinonen

Helsinki Institute of Physics, Juhani Keinonen, 01.01.2005 → 31.12.2005, Finland

Kumpulan avaruuskeskus, ohjausryhmä, Juhani Keinonen, 01.01.2005 → 31.12.2005, Finland

Programme Advisory Board, Accelerator laboratory of the University of Jyväskylä, Juhani Keinonen, 01.01.2005 → 31.12.2005, Finland

Tieteelisten seurain valtuuskunta, varapuheenjohtaja; Federation of Finnish Learned Societies, Vice President, Juhani Keinonen, 01.01.2005 → 31.12.2005, Finland

Helsinki Institute of Physics, Juhani Keinonen, 01.01.2006 → 31.12.2006, Finland

Kumpula Space Centre, steering group, Juhani Keinonen, 01.01.2006 → 31.12.2006, Finland

Programme Advisory Board, Accelerator laboratory of the University of Jyväskylä, Juhani Keinonen, 01.01.2006 → 31.12.2006, Finland

Tieteelisten seurain valtuuskunta, varapuheenjohtaja; Federation of Finnish Learned Societies, Vice President, Juhani Keinonen, 01.01.2006 → 31.12.2006, Finland


Helsingin yliopiston nanotehteen ohjausryhmä, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland

Helsinki Institute of Physics, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland

Kumpula Space Centre, steering group, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland

9
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

MATENA/Räisänen

Programme Advisory Committee, Accelerator Laboratory of the University of Jyväskylä, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland
Suomalaisen Tiedeakatemian 100-vuotisjuhlien symposium "Energy Issues - Challenge for Physics" 31.8.2007, program organizing committee, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland
Tieteellisten seurain valtuuskunta, varapuheenjohtaja; Federation of Finnish Learned Societies, Vice President, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland
Helsingin yliopiston nanotieteen ohjausryhmä, Juhani Keinonen, 01.01.2008 → 31.12.2008, Finland
Kumpula Space Centre, steering group, Juhani Keinonen, 01.01.2008 → 31.12.2008, Finland
Programme Advisory Committee, Accelerator Laboratory of the University of Jyväskylä, Juhani Keinonen, 01.01.2008 → 31.12.2008, Finland
Tieteellisten seurain valtuuskunta, varapuheenjohtaja; Federation of Finnish Learned Societies, Vice President, Juhani Keinonen, 01.01.2008 → 31.12.2008, Finland

Arkady Krasheninnikov,

Jussi Samuli Lehtola,
Physics Days 2007 (41. Annual Meeting of the Finnish Physical Society), Tallinn 15.-17.3.2007, member of the organizing committee, Jussi Samuli Lehtola, 01.01.2007 → 31.12.2007, Finland
International Association of Physics Students IAPS, member of the Executive committee, Jussi Samuli Lehtola, 01.01.2008 → 31.12.2008

Kai Nordlund,
Fysikersamfundet i Finland r.f., Kai Nordlund, 01.01.2005 → 31.12.2005, Finland
The Finnish Physical Society, Division of Computational Physics, Kai Nordlund, 01.01.2005 → 31.12.2005, Finland
10th Workshop on Modelling of FeCr, chairman of the organizing committee, Kai Nordlund, 01.01.2006 → 31.12.2006, Finland
Fysikersamfundet i Finland r.f., Kai Nordlund, 01.01.2006 → 31.12.2006, Finland
Ion Beam Modification of Materials 2006, member of the scientific committee, Kai Nordlund, 01.01.2006 → 31.12.2006
De finlandssvenska Fysikdagarna 20.-22.10.2007, ordförande av organisationskommittén, Kai Nordlund, 01.01.2007 → 31.12.2007, Finland
Fysikersamfundet i Finland r.f. - Physical Society in Finland, Kai Nordlund, 01.01.2007 → 31.12.2007, Finland
Physics Days 2007 (41. Annual Meeting of the Finnish Physical Society), Tallinn 15.-17.3.2007, program committee, Kai Nordlund, 01.01.2007 → 31.12.2007, Finland
The Board of the Computational Physics Division of the Finnish Physical Society, Kai Nordlund, 01.01.2008 → 31.12.2008, Finland

Eero Rauhala,
Ion Beam Analysis Conference, Permanent member of the international organizing committee, Eero Rauhala, 01.01.2005 → 31.12.2005
MATENA/Räisänen

Physics Days 2007 (41st Annual Meeting of the Finnish Physical Society), Tallinn 15.-17.3.2007, organising committee, Eero Rauhala, 01.01.2007 → 31.12.2007, Finland

Physics Days 2007 (41st Annual Meeting of the Finnish Physical Society), Tallinn 15.-17.3.2007, organising committee, Eero Rauhala, 01.01.2007 → 31.12.2007, Finland

Jyrki Räisänen, Editorial Board Member, Jyrki Räisänen, 2000 → 2005, Netherlands

board member, Jyrki Räisänen, 2004 → 2009, Finland

council vice member, Jyrki Räisänen, 2004 → 2009, Finland

IBA2005 International Conference, member of the programme committee, Jyrki Räisänen, 01.01.2005 → 31.12.2005


COST Domain expert, Jyrki Räisänen, 2010 → 2014, Finland

Member, Jyrki Räisänen, 2010 → 2012, Hungary

board member, Jyrki Räisänen, 2010 → 2013, Finland

Ritva Serimaa, EMBL Priority Committee, Ritva Serimaa, 2003 → 2009, Germany

EMBL Priority committee, Ritva Serimaa, 01.01.2005 → 31.12.2005, Germany


Representative of Cost E35 (Fracture Mechanics and Micromechanics of Wood and Wood Composites with regard to Wood Machining) working group 1 (Microstructure and Micromechanics), board member, Ritva Serimaa, 01.01.2005 → 31.12.2005

COST E50 (Cell wall macromolecules and reaction wood) network, Ritva Serimaa, 01.01.2006 → 31.12.2006

Physics Days 2007 (41st Annual Meeting of the Finnish Physical Society), Tallinn 15.-17.3.2007, program committee, Ritva Serimaa, 01.01.2006 → 31.12.2006, Finland

Representative of Cost E35 (Fracture Mechanics and Micromechanics of Wood and Wood Composites with regard to Wood Machining) working group 1 (Microstructure and Micromechanics), board member, Ritva Serimaa, 01.01.2006 → 31.12.2006

3rd Workshop of Nordic Network for Women in Physics, member of the International Advisory Committee, Ritva Serimaa, 01.01.2007 → 31.12.2007, Denmark

EMBL Priority Committee, Ritva Serimaa, 01.01.2007 → 31.12.2007, Germany

European Science Foundation ESF, Ritva Serimaa, 01.01.2007 → 31.12.2007

Physics Days 2007 (41st Annual Meeting of the Finnish Physical Society), Tallinn 15.-17.3.2007, program committee, Ritva Serimaa, 01.01.2007 → 31.12.2007, Finland

Research Council of Norway, Ritva Serimaa, 01.01.2007 → 31.12.2007, Norway

Application for a Center of Excellence, Ritva Serimaa, 01.01.2008 → 31.12.2008, Denmark


ESF European Science Foundation, Research Networking Programme application, Ritva Serimaa, 01.01.2008 → 31.12.2008

Member of the EMBL Priority Committee (Synchrotron radiation research of biological systems, Hamburg Outstation), Ritva Serimaa, 01.01.2008 → 31.12.2008, Germany

National Science foundation, Ritva Serimaa, 01.01.2008 → 31.12.2008, United States

Nordic Network for Women in Physics, Ritva Serimaa, 01.01.2008 → 31.12.2008

Suomen fysiikkoilma, Ritva Serimaa, 2008 → 2012


Commission for small angle scattering, Ritva Serimaa, 2009 → ...

Suomen synkrotronisäteilyn käyttäjien yhdistys, Ritva Serimaa, 2009 → 2012
Antti Tolvanen,

Membership or other role in public Finnish or international organization
Keijo Hämäläinen,
Suomen Akatemia, Visku tiedekilpailu, pakintopaneelin jäsen, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, Finland
Tutki-kokele-kehät 2006, nuorten tiedekilpailu, pakintolautakunnan puheenjohtaja, Keijo Hämäläinen, 01.01.2006 → 31.12.2006, Finland
Yliopisto-lehti, Keijo Hämäläinen, 01.01.2007 → 31.12.2007, Finland
Suomalainen tieedekatemia, Kananottaja sarjan valmisteleytyönmäärä, jäsen, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, Finland
Suomen Akatemia, tutkimusinfrastruktuurien asiantuntijaryhmän jäsen, Keijo Hämäläinen, 01.01.2008 → 31.12.2008, Finland

Juhani Keinonen,
Heurekan valtuuston jäsen, Juhani Keinonen, 01.01.2005 → 31.12.2005, Finland
LUMA-keskus, johtoryhmän jäsen, Juhani Keinonen, 01.01.2006 → 31.12.2006, Finland
Liikenne- ja viestintäministeriö, selvitysmies Ilmatieteen laitoksen ja Merentutkimuslaitoksen yhteistyöasialla, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland
Heurekan valtuuston jäsen, Juhani Keinonen, 01.01.2008 → 31.12.2008, Finland

Kai Nordlund,
Domarkollegiets ordförande, tävlingen för teknik och naturvetenskap för gymnasier och högstadier "TekNatur", Kai Nordlund, 10.02.2006 → 11.02.2006, Finland

Jyrki Räisänen,

Membership or other role of body in private company/organisation
Juhani Keinonen,
Suomen Saksan-instituutin valtuuskunnan jäsen, Juhani Keinonen, 01.01.2005 → 31.12.2005, Finland
Suomen Saksan-instituutin valtuuskunnan jäsen, Juhani Keinonen, 01.01.2006 → 31.12.2006, Finland
Suomen Saksan-instituutin valtuuskunnan jäsen, Juhani Keinonen, 01.01.2007 → 31.12.2007, Finland
Suomen-Saksan instituutin valtuuskunnan jäsen, Juhani Keinonen, 01.01.2008 → 31.12.2008

Eero Rauhala,
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

MATENA/Räisänen

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

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

Kumpulan liikuntahallisäätiön hallitus, varajäsen, Eero Rauhala, 01.01.2005 → 31.12.2005, Netherlands

Ritva Serimaa

Nordic Network for Women in Physics, Ritva Serimaa, 01.01.2006 → 31.12.2006

Nordic Network for Women in Physics, Ritva Serimaa, 01.01.2007 → 31.12.2007

Participation in interview for written media

Tommy Ahlgren

Hufvudstadsbladet, sunnuntainumeron koko aukeaman haastattelu, toim. Erik Wahlström, Tommy Ahlgren, 04.04.2004 → 31.12.2011, Finland

Hufvudstadsbladet, sunnuntainumeron koko aukeaman haastattelu, toim. Jenny Bäck, Tommy Ahlgren, 11.09.2005 → 10.03.2011

Mikko Oskari Hakala

Chemical Science, A magazine providing a snapshot of the latest developments across the chemical sciences in the Internet, Royal Society of Chemistry, Mikko Oskari Hakala, 29.05.2007 → 31.12.2011, United States

CSC news Feb 9/2008, p. 9, Mikko Oskari Hakala, 01.01.2008 → 31.12.2011, Germany

Kalle Johannes Heinola

Tanttiteleelin yhtäyksissä Urusan kuukausiesitelmä, Tieteiden talo, Helsinki, Kalle Johannes Heinola, 17.10.2006 → 31.12.2011, Finland

Keijo Hämäläinen


Yliopisto 2/2003, Lyhyet korkeakoulu- ja tiedeaukset, haastattelu, Keijo Hämäläinen, 01.01.2003 → 31.12.2011, Finland


Kansalainen Fysiikan päivä, Physicum, Keijo Hämäläinen, 08.10.2005 → 31.12.2011, Finland

Lasten fyysikan päivityksen puhe, tiedekeskus Heureka, yleisöesitelmä, Keijo Hämäläinen, 22.01.2005 → 31.12.2011, Finland

Puoli kaupunkia nro 3, haastattelu Lasten fyysikan päivityksen puheen puheen toim. Paula Havaste, Keijo Hämäläinen, 03.02.2005 → 31.12.2011, Finland

Studio Generalia, Joensuun yliopisto, Keijo Hämäläinen, 07.04.2005 → 31.12.2011, Finland


YLE, Alueuutiset, välähdyksiä tapahtumasta, Keijo Hämäläinen, 13.05.2005 → 31.12.2011, Finland


Läänivaalit, haastattelu, toim. Arto Vänttinen, s. 1 ja 9, Keijo Hämäläinen, 27.10.2006 → 31.12.2011, Finland

MAOL Espoon kerro, Fysiikka, Keijo Hämäläinen, 24.01.2006 → 31.12.2011, Finland

Tekniikan aika, Keijo Hämäläinen, 24.01.2006 → 31.12.2011, Finland


Universitas Helsingiensis 4/06, Newsbrief, Keijo Hämäläinen, 01.01.2006 → 31.12.2011, Finland

13
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE
UNIVERSITY OF HELSINKI

MATENA/Räisänen

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

Europhysicsnews vol. 38, no 5 2007, page 10, Keijo Hämäläinen, 01.01.2007 → 31.12.2011, Finland
Tieteen päivät ‘07, Keijo Hämäläinen, 12.01.2007 → 31.12.2011, Finland
Tieteen päivät ‘07, Keijo Hämäläinen, 14.01.2007 → 31.12.2011, Finland
Helsingin Sanomat, Torsti-palsta, Keijo Hämäläinen, 01.01.2008 → 31.12.2011, Finland
Tekniikka & Talous, haastattelu s. 30, toimittaja Raili Leino, Keijo Hämäläinen, 16.01.2009 → 31.12.2011, Finland

Juhani Keinonen,
Acatiimi 10/99, haastattelu, s. 9, Juhani Keinonen, 01.01.1999 → 31.12.2011, Finland
Helsingin Sanomat, toimittaja Marjukka Lilien, haastattelu, s. A 10, Juhani Keinonen, 22.01.2001 → 31.12.2011, Finland
YLE1:n A-piste ohjelma, haastattelu, Juhani Keinonen, 02.04.2004 → 31.12.2011, Finland
Helsingin Sanomat, Tiede & Luonto, haastattelu, toimittaja Tiimo Paukku, Juhani Keinonen, 15.03.2005 → 31.12.2011, Finland
Kotimaiset tiedelehdet verkkoon -seminaari, Arppeanum-sali, järjestäjänä Finnish Open Access working group (FinnOA), Juhani Keinonen, 05.05.2006 → 31.12.2011, Finland
Helsingin Sanomat, Tiede & Luonto, haastattelu, toimittaja Tiimo Paukku, Juhani Keinonen, 15.03.2005 → 31.12.2011, Finland

Arkady Krasheninnikov,
Kemia-Kemi vol. 33, nro 5, s. 21, tiedeuutinen, Arkady Krasheninnikov, 01.01.2006 → 31.12.2011, Finland
Workshop on Modeling, Simulation and Computational Science: Perspective from different sciences, Panel discussion, University of Helsinki, Philosophy of Science Group, Arkady Krasheninnikov, 29.11.2007 → 31.12.2011, Japan

Kai Nordlund,
Matematik-temadag, Brändö gymnasium, Kai Nordlund, 27.11.2002 → 31.12.2011, Finland
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

MATENA/Räisänen


YLE1, tiedeohjelma Radioaari, haastattelu, toimittaja Maija Typpi, Kai Nordlund, 01.01.2005 → 31.12.2011, Finland

Forum nr 11/06, intervju, redaktör Heidi Backas, Kai Nordlund, 23.11.2006 → 31.12.2011, Finland

Katedraleskolan i Åbo, föreläsning, Kai Nordlund, 19.01.2006 → 31.12.2011, Finland

Tekniska Föreningen i Finland, Helsingfors, föreläsning, Kai Nordlund, 31.01.2006 → 31.12.2011, Finland


HPC wire (www.hpcwire.com/hpc/1625400.html), The Leading Source for Global News and Information Covering the Ecosystem og High Productivity Computing, interview, editor Christopher Lazou, HiPerCom Consultants Ltd., Kai Nordlund, 22.06.2007 → 31.12.2011, Finland

Hufudstadbladet, intervju, s. 14-15, Kai Nordlund, 11.02.2007 → 31.12.2011, Finland

Tieteen päivät '07, Kai Nordlund, 11.01.2007 → 31.12.2011, Finland

Tieteen päivät '07, Kai Nordlund, 13.01.2007 → 31.12.2011, Finland


Tieteen toteteknikka tietotyöntöö lehti 3/2007, s. 4, tiedeautoinen, Kai Nordlund, 01.01.2007 → 31.12.2011, Finland


Tieteen toteteknikka, ajankohtaista-palsta, Kai Nordlund, 01.01.2008 → 31.12.2011, Finland

cscnews July 2/2008, p. 6, Kai Nordlund, 01.01.2008 → 31.12.2011, Finland

Liisa Porra ,
Helsingin sanomat, Tiede & Luonto, Liisa Porra, 05.06.2007 → 31.12.2011, Canada

Ritva Serimaa ,
LERU Kids University, Ritva Serimaa, 10.11.2005 → 31.12.2011, Finland

Second Workshop of the Nordic Network for Women in Physics, Ritva Serimaa, 29.11.2006 → 31.12.2011, Finland

Third Workshop of the Nordic Network for Women in Physics, Technical University of Denmark, Ritva Serimaa, 16.08.2007 → 31.12.2011, Finland

Third Workshop of the Nordic Network for Women in Physics, Technical University of Denmark, Ritva Serimaa, 17.08.2007 → 31.12.2011, Finland

Fysiikan täydennyskoulutuskurssi, Helsingin yliopisto, Physicum, Ritva Serimaa, 05.06.2008 → 31.12.2011, Finland

Participation in radio programme

Mikko Oskari Hakala ,
Yle Radio 1, Radaattori, haastattelu toimittajana Sisko Lökkanen, Mikko Oskari Hakala, 01.01.2006 → 31.12.2011, Finland

Yle Radio 1, Radaattori-ohjelman uusinta, haastattelu toimittajana Sisko Lökkanen, Mikko Oskari Hakala, 01.01.2006 → 31.12.2011, Finland

Keijo Hämäläinen ,
Tiedekahvila, radio-ohjelma, toimittaja Maija Typpi, Keijo Hämäläinen, 07.01.2005 → 31.12.2011, Finland

Tiedekahvila, radio-ohjelma, toimittaja Maija Typpi, Keijo Hämäläinen, 05.01.2005 → 31.12.2011, Finland

Yle Radio 1, Radaattori, haastattelu toimittajana Sisko Lökkanen, Keijo Hämäläinen, 01.01.2006 → 31.12.2011, Finland

Yle Radio 1, Radaattori-ohjelman uusinta, haastattelu toimittajana Sisko Lökkanen, Keijo Hämäläinen, 01.01.2006 → 31.12.2011, Finland
MATENA/Räisänen

YLE Radio 1, Radiaattori, toimittaja Sisko Loikkanen, Keijo Hämäläinen, 07.02.2007 → 31.12.2011, Finland

**Participation in TV programme**

**Tommy Ahlgren**, YLE-teema TV-ohjelma, Tommy Ahlgren, 24.05.2005 → 31.12.2011, United States

**Kalle Johannes Heinola**, YLE-teema TV-ohjelma, Kalle Johannes Heinola, 24.05.2005 → 31.12.2011, United States

**Keijo Hämäläinen**, Aamu-TV, Keijo Hämäläinen, 08.08.2005 → 31.12.2011, Finland
Aamu-TV, Keijo Hämäläinen, 10.08.2005 → 31.12.2011, Finland
Aamu-TV, Keijo Hämäläinen, 12.08.2005 → 31.12.2011, Finland

**Kai Nordlund**, TV1 Tutkittu jutu, haastattelu, Kai Nordlund, 26.05.2005 → 31.12.2011, Finland
TV1 Tutkittu jutu, haastattelu, Kai Nordlund, 01.01.2005 → 31.12.2011, Finland
YLE-teema TV-ohjelma Tutkittu jutu, haastattelu, Kai Nordlund, 01.01.2005 → 31.12.2011, Finland
Research Group: Räisänen J

Basic statistics
Number of publications (P) 377
Number of citations (TCS) 1,962
Number of citations per publication (MCS) 5.20
Percentage of uncited publications 31%
Field-normalized number of citations per publication (MNCS) 1.23
Field-normalized average journal impact (MNJS) 1.36
Field-normalized proportion highly cited publications (top 10%) 1.27
Internal coverage .80

Trend analyses

Collaboration

Performance (MNCS) by collaboration type