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

RC-Specific Evaluation of CoE_VIRRES – Center of Excellence in Virus Research

Seppo Saari & Antti Moilanen (Eds.)
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**Title:**

**Summary:**
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. Panellists, 49 and two special experts in five panels evaluated all the evaluation material as a whole and discussed the feedback for RC-specific reports in the panel meetings in Helsinki. The main part of this report is consisted of the feedback which is published as such in the report.

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:**

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<th>Main scientific field of research:</th>
<th>Biological, Agricultural and Veterinary Sciences</th>
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<tr>
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<td>1. Research of the participating community represents the international cutting edge in its field</td>
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<tr>
<td>RC’s responsible person:</td>
<td>Bamford, Dennis</td>
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**Keywords:**
Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community

**Series title and number:**
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<td>Enquiries: <a href="mailto:seppo.o.saari@helsinki.fi">seppo.o.saari@helsinki.fi</a></td>
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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, MSocSc **Jussi Vauhkonen**
Panel members

CHAIR
Professor Ary A. Hoffman
Ecological genetics, evolutionary biology, biodiversity conservation, zoology
University of Melbourne, Australia

VICE-CHAIR
Professor Barbara Koch
Forest Sciences, remote sensing
University of Freiburg, Germany

Professor Per-Anders Hansson
Agricultural engineering, modeling, life cycle analysis, bioenergy
Swedish University of Agricultural Sciences

Professor Danny Huylebroeck
Developmental biology
Katholieke Universiteit Leuven, Belgium

Professor Jonathan King
Virus assembly, protein folding
Massachusetts Institute of Technology MIT, USA

Professor Hannu J.T. Korhonen
Functional foods, dairy technology, milk hygiene
MTT Agrifood Research Finland

Professor Kristilna Kruus
Microbiological biotechnology, microbiological enzymes, applied microbiology
VTT Technical Research Centre of Finland

Professor Joakim Lundeberg
Biochemistry, biotechnology, sequencing, genomics
KTH Royal Institute of Technology, Sweden

Professor Dominiek Maes
Veterinary medicine
Ghent University, Belgium

Professor Olli Saastamoinen
Forest economics and policy
University of Eastern Finland

Professor Kai Simons
Biochemistry, molecular biology, cell biology
Max-Planck-Institute of Molecular Cell Biology and Genetics, 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 and by one evaluator outside the panels.
External Expert
Professor Anders Linde
Oral biochemistry
Faculty of Odontology
Göteborg University
Sweden

Experts from the Other Panels
Professor Caitlin Buck, from the Panel of Natural Sciences
Professor Ritske Huismans, from the Panel of Natural Sciences
Professor Johanna Ivaska, from the Panel of Medicine, biomedicine and health sciences
Professor Lea Kauppi, from the Panel of Natural Sciences
Professor Holger Stark, from the Panel of Natural 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 Moilanen, 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.

HELSINKI UNIVERSITY LIBRARY
Provision of the publication analyses
Dr Maria Forsman, Chief Information Specialist in the Helsinki University Library, managed with her 10 colleagues the bibliometric analyses in humanities, social sciences and in other fields of sciences where CWTS analyses were not applicable.
Acronyms and abbreviations applied in the report

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

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

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

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

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

1.1 RC-specific evaluation reports

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

It is essential to emphasise that the evaluation combines both meta-evaluation 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.
- to enhance the research conducted at the University by taking into account the diversity, originality, multidisciplinary nature, success and field-specificity,
- to recognize the conditions and prerequisites under which excellent, original and high-impact research is carried out,
- to offer the academic community the opportunity to receive topical and versatile international peer feedback,
- to better recognize the University’s research potential.
- to exploit the University’s TUHAT research information system to enable transparency of publishing activities and in the production of reliable, comparable data.

1.3 Evaluation method

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

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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\(^3\) compilations on publications and other scientific activities\(^4\)
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.

\(^3\) TUHAT (acronym) of Research Information System (RIS) of the University of Helsinki

\(^4\) Supervision of thesis, prizes and awards, editorial work and peer reviews, participation in committees, boards and networks and public appearances.
1.5 Evaluation material

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

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

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

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

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

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

Background material

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

The Finnish Universities/Research Institutes
- Finnish University system
- Evaluation of the Finnish National Innovation System
- The State and Quality of Scientific Research in Finland. Publication of the Academy of Finland 9/09.

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

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

1. Focus and quality of the RC’s research
   - Description of
     - the RC’s research focus.
     - the quality of the RC’s research (incl. key research questions and results)
     - the scientific significance of the RC’s research in the research field(s)
   - Identification of the ways to strengthen the focus and improve the quality of the RC’s research
   The additional material: TUHAT compilation of the RC’s publications, analysis of the RC’s publications data (provided by University of Leiden and the Helsinki University Library)
   A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

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

2. Practises and quality of doctoral training
   - Organising of the doctoral training in the RC. Description of the RC’s principles for:
     - recruitment and selection of doctoral candidates
     - supervision of doctoral candidates
     - collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes
     - good practises and quality assurance in doctoral training
     - assuring of good career perspectives for the doctoral candidates/fresh doctorates
   - Identification of the RC’s strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.
   The additional material: TUHAT compilation of the RC’s other scientific activities/supervision of doctoral dissertations
   A written feedback from the aspects of: processes and good practices related to leadership and management
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

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

3. The societal impact of research and doctoral training
   - Description on how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).
   - Identification of the ways to strengthen the societal impact of the RC’s research and doctoral training.
   The additional material: TUHAT compilation of the RC’s other scientific activities.
   A written feedback from the aspects of: societal impact, national and international collaboration, innovativeness
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)
4. International and national (incl. intersectoral) research collaboration and researcher mobility
   - Description of
     - the RC’s research collaborations and joint doctoral training activities
     - how the RC has promoted researcher mobility
     - Identification of the RC’s strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.

A written feedback from the aspects of: scientific quality, national and international collaboration
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

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

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

A written feedback from the aspects of: processes and good practices related to leadership and management
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

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

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

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

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness, future significance
   - Strengths
   - Areas of development
   - Other remarks
   - Recommendations

8. The RC’s strategic action plan for 2011-2013
   - RC’s description of their future perspectives in relation to research and doctoral training.

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance
   - Strengths
   - Areas of development
9. Evaluation of the category of the RC in the context of entity of the evaluation material (1-8)

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

- Strengths
- Areas of development
- Other remarks
- Recommendations

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

10. Short description of how the RC members contributed the compilation of the stage 2 material
Comments on the compilation of evaluation material

11. How the UH’s focus areas are presented in the RC’s research?
Comments if applicable

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

13. RC-specific conclusions

1.7 Evaluation criteria

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

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

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

Description of criteria levels

Question 1 – FOCUS AND QUALITY OF THE RC’S RESEARCH

Classification: Criteria (level of procedures and results)

Outstanding quality of procedures and results (5)

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

In cases where the research is of a national character and, in the judgement of the evaluators, should remain so, the concepts of “international attention” or “international impact” etc. in the grading criteria above may be replaced by “international comparability”.
Operations and procedures are of outstanding quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are in alignment with the documentation. The ambition to develop the community together is of outstanding quality.

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

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

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

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

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

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

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

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

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

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

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

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

**Question 2 – DOCTORAL TRAINING**

**Question 3 – SOCIETAL IMPACT**

**Question 4 – COLLABORATION**

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

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

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

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

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

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

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

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

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

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

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

**Question 9 – CATEGORY**

Participation category – fitness for the category chosen

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

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

**An example of outstanding fitness for category choice (5)**

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

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

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

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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

This RC has made a series of important and surprising findings that has brought increased coherence to the general field of Virology. Among their strengths is the inclusion of a much wider range of viruses - animal viruses, bacterial viruses infecting diverse hosts and Archaeal viruses - that would normally be studied in typical medical virology departments. Their research has provided an important body of evidence showing that despite the enormous sequence diversity among viruses - preventing the establishment of coherent evolutionary trees - structural studies establish much closer relationships to seemingly very distant viruses. The two Centres of Excellence grants provide support for continued integration of seemingly disparate research findings.

Investigators in the group are connected to a broad network of international collaborators, reflected in the publication record.

An additional noteworthy achievement has been the development of dsRNA polymerases from RNA viruses into valuable tools for RNA silencing biotechnology, now fully commercialized. (Does this bring an income stream to the RC?). This carried on a long tradition of basic research into bacterial viruses yielding proteins of great use to bioscience and biotechnology.

A particular strength of this RC from the perspective of Virology is their continuing and deepening investigations of viruses that are not immediate causes of human mortality. This is a particular strength of this Finnish program, absent in many other national programs.

Virology research programs are often fragmented by insularity of each virus group - going only to meetings focused on their virus; reading only the literature pertinent to their virus, etc. It will be important to preserve the collectivity and interactions operating in this RC, to keep conduits of communication, interaction and collaboration open.

Question / Comment
The fact that many different viruses are investigated offers a lot of benefits (many things can be learnt from comparative studies). However, it may also include a risk in the sense that the focus may be diluted, especially for viruses with direct implications for medicine and society.

Numeric evaluation: 4.5 (Excellent)

2.2 Practises and quality of doctoral training

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

ASPECTS: Processes and good practices related to leadership and management

Some twenty five students have been enrolled in doctoral training during the study period, with 12 degrees awarded. The training program appears to be efficient with multiple members (all of the senior scientists) of the RC serving on thesis committees, and academic oversight provided, if it is understood correctly, primarily through the Viikki Doctoral Program in Molecular Biosciences. It is not clear from the description if the doctoral program ensures that student training extends outside the boundaries of their disciplinary research, as is needed in today's (and tomorrow's) world.

The participation of the RC in offering courses and workshops in emerging areas of virology and biotechnology gives evidence of active pedagogy.

It would have been helpful to learn of the positions obtained by the 12 PhDs produced to date.

The formal guidelines of the doctoral program are followed and there is a good collaboration between the RC, faculties and doctoral programs. The guidance of PhD students appears to be very well structured (one or two supervisors, thesis committee with at least two independent scientific advisors), as well as the evaluation of the progress.

Numeric evaluation: 4 (Excellent)

2.3 The societal impact of research and doctoral training

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

ASPECTS: Societal impact, national and international collaboration, innovativeness

This RC has been singularly productive in translating basic science discoveries to practical application. Thus the elucidation of the Phi6 polymerase has led to the RNA silencing biotechnology products noted above. The group's initiative to try to develop RNA plant vaccines in consort with European Union research and private partners could turn out to be very important in agriculture. Their efforts to improve purification of unusual viruses is leading to the development of purification technologies that may be broadly useful.

Question / Comment

Maybe the communication to the society of these important research findings could be optimized. Many important findings have been obtained, but it is not that clear from the report whether these are sufficiently communicated to the society (e.g. by means of technical papers, presentations for less specialized audience, etc.)

Numeric evaluation: 4.5 (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**

This RC has a strong tradition of international collaboration, with scientists in many different countries, and it is well known outside of Finland in part due to this tradition.

**Question / comment**

It is not clear how this (inter)national collaboration is organized. Is there any structure or continuation in the collaboration, or is the collaboration done on an ad-hoc basis, depending on the activities of specific persons in the group. So, the set-up or structure of the collaboration should be more clearly explained.

**Numeric evaluation: 4.5 (Excellent)**

### 2.5 Operational conditions

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

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

The RC clearly currently has very functional genomics, proteomics, virus preparation and purification facilities, and an international cryo-electron microscopy facility. Maintenance of such facilities requires some level of permanent staff. It is not clear to the reviewers to what extent there is institutional core support for the overall facilities or operations, and to what extent they depend on continuous grant awards and new funding. Long term productivity will require some stable core funding. Obviously the funding of expensive equipment and infrastructure is an issue that requires continuous thought and input (as in many research groups). They involve the whole campus and therefore mechanisms should be in place that allow efficient management and maintenance of the Viikki campus infrastructure.

### 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**

Clearly the RC has benefitted from enlightened leadership to date. There is every reason to expect this to continue. Though some senior PIs are moving on, the talent remaining is adequate to the task. Hopefully the management of the Viikki Doctoral Program will provide a coherent educational framework to integrate doctoral students efficiently. Is there coordination between the different RCs on the campus to provide this integration?
The management is well structured with a director and vice director coordinating the administrative issues, and with the PIs being responsible for the scientific strategies, and the PIs being responsible for the individual projects.

**Question / comment**
- Who is finally deciding to apply for a specific project? Does it depend on the presence of funding for a specific topic, or are applications really decided and made by the group, independent of the (chance for) availability of funding by the funding organizations?
- Is the majority of funding obtained based on open calls, or based on calls with specific research topics?

### 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 organisations), and
  2) The total sum of funding which the organisation in question had decided to allocate to the RCs members during 1.1.2005–31.12.2010.

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

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

Most of the funding originates from the Academy of Finland, and from the Ministry of Education and Culture.

**Question / comment**
The international / European funding appears to represent only a very limited percentage of the total funding.

### 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 strategic plan of the RC is poorly described. The RC is aggressively pursuing the external funding required to further grow and develop their research and doctoral training programs. But how does the RC want to meet the challenges that they face? What about recruitment of new group leaders? Are there synergistic goals that focus the research interests of the member groups so that they continue to move the field forward?

Given the staff changes, and the enormous diversity of the world of viruses, a real strategic plan should be made for the coming five years.
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 chose Category 1 ‘The research of the participating community represents the international cutting edge in its field’ as their category. This does fit with achievements of the RC. Nevertheless the challenge will be how to maintain this status.

Numeric evaluation: 4 (Excellent)

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

—

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

Focus area 2: The basic structure of life

The research area of the RC is in line with the focus areas of UH.

2.12 RC-specific main recommendations

See Section 2.13.

2.13 RC-specific conclusions

This RC has made important contributions in areas of virology that are not traditionally the focus of the common Virology Departments in medical schools, for example viruses of Archaea. Their ability to carry out this work is a strength of this University of Helsinki program and contribution to Finnish science. Their characterization of phage polymerases has been important for the study of hepatitis viruses, and has also resulted in commercial enzyme product used in studies of RNA silencing and RNA metabolism throughout the world. They have developed a significant doctoral training program, clearly able to produce skilled researchers. They would benefit from broader consideration of what training and education is required to produce PhDs who do not proceed in the area of the research training, but can still succeed in some professional or pedagogical arena.

With the loss of key members of the RC to other institutions, the RC needs a strategic plan as to renewing their senior staff, as well as a strategy for the focus of their investigations.

2.14 Preliminary findings in the Panel-specific feedback

Basic research with bacterial viruses has made enormous contributions to the development of genetic engineering and biotechnology, none of which could have been predicted (e.g. restriction enzymes). This RC has continued this history. It is not unreasonable to assume that their further investigations of seemingly obscure viruses will also yield future breakthroughs in biotechnology.
Nonetheless, with the loss of key members of the RC to other institutions, the RC needs a strategic plan as to renewing their senior staff, as well as a biological strategy for the focus of their investigations, given the diversity of their research targets.

2.15 Preliminary findings in the University-level evaluation

Doctoral training is not just to provide skilled labor in particular areas of research. It should produce the personnel needed in many areas - research, university teaching, polytechnic teaching, perhaps high school teaching, government agencies, biotechnology industry, etc. It is not clear that the oversight and design of doctoral training programs is informed by these broader goals.
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:
Center of Excellence in Virus Research (CoE-VIRRES)

LEADER OF THE RESEARCHER COMMUNITY:
Professor Dennis Bamford, Department of Bioscience, Institute of Biotechnology

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: Bamford, Dennis
E-mail: dennis.bamford@helsinki.fi
Phone: 19159100
Affiliation: Department of Biosciences and Institute of Biotechnology
Street address: Viikinkaari 5 D

2 DESCRIPTION OF THE PARTICIPATING RESEARCHER COMMUNITY (RC)

Name of the participating RC (max. 30 characters): Center of Excellence in Virus Research
Acronym for the participating RC (max. 10 characters): CoE_VIRRES
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 motivation of our RC to go forward to the University of Helsinki evaluation process is obvious: the time period of the evaluation (2005 -2010) overlaps with our Center of Excellence in Structural Virology (2000 – 2005) and Center of Excellence in Virus Research (2006 – 2011). All the Principle Investigators of the CoE_VIRRES have been or are currently members of these national Center of Excellences. There is high coherence in research and strong culture of collaborative work within the CoE_VIRRES. Our research community is also efficient in doctoral training. In addition, we coordinate doctoral training in the Viikki Doctoral Program in Molecular Biosciences.

3 SCIENTIFIC FIELDS OF THE RC

Main scientific field of the RC’s research: biological, agricultural and veterinary sciences
RC’s scientific subfield 1: Virology
RC’s scientific subfield 2: Biochemistry and Molecular Biology
RC’s scientific subfield 3: Microscopy
RC’s scientific subfield 4: Microbiology
Other, if not in the list: Bioinformatics
Structural biology

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): The RC is an internationally recognized research power house, which is among the leaders of its field.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

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 RC has been operating in the context of two Center of Excellences (CoE): CoE in Structural Virology 2000-2005 and CoE in Virus Research 2006-2011. The profound basic research conducted has allowed us to develop true applications and has brought up ideas that concern the whole viral universe. Combining high resolution structural results and functional data obtained by molecular biology methods we have been able to probe much deeper evolutionary relationships for viruses than can be achieved by analyzing genomic databases and using more traditional methods. This has lead to the hypothesis that the entire virosphere can be organized to a relatively small number of virus lineages containing viruses infecting hosts in all three domains of life (bacteria, archaea and eukarya). Such observation has also profound consequences to how we classify viruses. At the same time we have been able to contribute to the mapping of the viral universe by providing information of the new viruses in high detail. The established RC provides excellent conditions for doctoral training because of the multi-level research group containing people from undergraduate students to graduate students, post docs, senior scientists and the responsible person.

Significance of the RC’s research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): The achievements described below have certainly made UH visible in the field of viruses. The created research environment has been a productive incubator for a flow of graduate students. We have made several groundbreaking observations on the structures and functions of both model and environmental viruses. One intriguing achievement which emerged through genomic and high resolution structural information was that capsids, the hallmark of viruses, are formed from a limited number of protein folds. This observation seems at odds with both the immense diversity of viruses as well as their current classification.

The other major avenue of research focuses on viral genome replication. Due to the detailed knowledge on the RNA dependent RNA polymerase it has been commercialized for production of dsRNA for gene silencing. Such products are now in markets world-wide.

The RC has provided excellent conditions for doctoral training for 25 graduate students of which twelve have graduated during the evaluation period. The Viiikki Doctoral Program in Molecular Biosciences provides doctoral training for the students in the Viiikki Campus.

Keywords: Virus structure, molecular virology, virus evolution and taxonomy, virus replication, virus assembly, biotechnology applications in the field of RNA silencing

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): Our RC has been among the national top research units for a long period of time. This is indicated by two consecutive Centers of Excellence and the
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 1 MATERIAL (registration form)

Academy Professorship of the director (currently there is one pending application in the second round). The research has been supported by several EU frame work grants and Human Frontier Science Program Grant as examples of major international funding. The RC operates in a large international research network including leading scientists in their fields of their expertise. The scientific progress has been published in a high number of scientific articles during the evaluation period.

The doctoral training has been very efficient with 12 graduations of students directly supervised by the members of our RC. In addition, operating one of the major biology doctoral programs is the responsibility of the CoE_VIRRES (see also above).

More specifically we have actively developed the virology teaching within the campus with Faculty of Agriculture and Forestry and Faculty of Veterinary Medicine (RAKE-hanke). This led to a campus wide virology teaching curriculum including graduate studies.

In addition to supervising University of Helsinki graduate students we have supervised students graduating from other universities such as University of Wuhan (China), Vytautas Magnus University (Lithuania), University of Jyväskylä (Finland), and Vilnius University (Lithuania).

Comments on how the RC's scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces): The bibliographic approach will give an indication of the activity of the RC but only a peer review of a panel which is expert in the field is able to rank the unit among the international leaders in the field. It seems that it will not be possible to get such accuracy in this evaluation due to the high number units to be evaluated and the diversity of their fields. This leads to a more general assessment and will allow only categorizing the groups to a number of ranks. Even this is much better than using bibliographic data alone (the shortcomings of such an approach are widely discussed in the major journals repeatedly).

The comment on our publishing strategy is that we first must produce high power science and then make the international scientific community aware of our work. It is of great help if the results time to time appear in the very top journals. We keep this course in our work.
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INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Name of the RC's responsible person: Bamford, Dennis
E-mail of the RC's responsible person: dennis.bamford@helsinki.fi

Name and acronym of the participating RC: Center of Excellence in Virus Research, CoE_VIRRES
The RC’s research represents the following key focus area of UH: 2. Elämän perusrakenne – The basic structure of life

Comments for selecting/not selecting the key focus area:

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

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

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The majority of all biological entities are viruses, infecting practically every cellular organism. They strongly modulate their host populations, mainly through viral diseases, but are also a major force behind biogeochemical cycles affecting our environment and climate. As viruses are also vehicles for horizontal exchange of genetic material their role in shaping cellular life is immense. Ecological studies show the diversity and extreme abundance of viruses. However, whilst the number of viruses pathogenic to humans, animals and plants and some model prokaryotic viruses have been studied in great detail, our understanding of how this massive viral universe is structured and how it operates is largely unknown.

Trillions of viral infections occur every second in the biosphere; a snapshot of a process that has been ongoing over several billion years. The molecular principles of viral infections and replication, the basis of this continuing process have been in our focus during several decades. Through our pioneering analyses of some well-understood virus systems we have pushed the leading edge of virology forward. Our scientific success is illustrated here with a few examples from the evaluation period. References refer to publications in the TUHAT data base.

1) It is not known how virus families are phylogenetically related. Similarly, the origin of viruses is obscure. One of the routes to understanding virus evolution is to look at molecular evolution by determining and comparing virus structures. This has been achieved using both X-ray crystallography, for example the elucidation of the complex, membrane-containing, double-stranded DNA (dsDNA) virus, PM2 (Abrescia et al. 2008); and cryo-electron microscopy coupled with image reconstruction of the archaeal viruses SH1 (Jäälinoja et al., 2008) and STIV2 (Happonen et al. 2010). Similarly it has been possible to unravel the organization of host-virus interactions by hybrid methods for pathogenic viruses such as hantavirus (Huiskonen et al. 2010) and human parechovirus (Seitsonen et al. 2010) as well as bacteriophage PRD1 (Merkel et al. 2005; Huiskonen et al. 2007). Using these comparative structural and bioinformatics analyses we have observed the same protein folds and virion architectures in viruses belonging to a variety of families and infecting hosts from all domains of life. This led to the hypothesis
that these viruses have a common ancestor dating back to the time before the separation of the current domains of cellular life which could revolutionize virus taxonomy (Benson et al. 2004; Bamford et al., 2005; Stromsten et al., 2005; Abrescia et al. 2008; Krupovic & Bamford, 2008; Krupovic & Bamford, 2009; Abrescia et al., 2010; Krupovic et al., 2010). To confound this further, we have recently described a novel type of archaeal viruses: pleomorphic enveloped DNA viruses that may have either single-stranded DNA (ssDNA) or dsDNA genomes (Pietilä et al., 2009; Roine et al., 2010). This also contradicts the current viral taxonomy based on nucleic acid content and suggests that related viruses may enclose different replication intermediates into the virion.

2) We have contributed to the mechanistic understanding of the viral RNA replication process by double-stranded RNA (dsRNA) bacteriophage phi6 RNA-dependent RNA polymerase (RdRp) (Laurila et al., 2005; Poranen et al., 2008a, Poranen et al., 2008b, Vilfan et al., 2008; Sarin et al., 2009). Interestingly, the closest structural and functional counterpart to the phi6 polymerase was shown to be the hepatitis C virus polymerase, highlighting the relevance of this information for viral RNA polymerases in general. These results have also led to biotechnical applications (Aalto et al., 2007; Nygardas et al., 2009). The phi6 RdRp is now commercially available worldwide and used in the field of RNA interference (RNAi).

3) One of the most significant virus-induced defense pathways in eukaryotic cells is the RNA silencing pathway based on small interfering RNA molecules (siRNA). We have obtained insights into the production of siRNA through the analysis of the RNA-dependent RNA polymerase of Neurospora crassa (Salgado et al., 2006; Lee et al., 2009; Aalto et al., 2010; Lee et al., 2010).

4) How are biological macromolecular complexes assembled? We have gained insights into such mechanisms by in vitro assembly of complex infectious nucleocapsids of bacteriophage phi6 using purified protein and nucleic acid constituents (Poranen et al., 2005; Poranen et al., 2008c). We have also significantly contributed to the understanding of the assembly of the light-harvesting bacterial organelle called the chlorosome which is being developed for sensors and bioenergy production (Psencik et al. 2006; Ikonen et al. 2007; Psencik et al. 2007; Arellano et al. 2008; Psencik et al. 2009).

5) One of the major steps in virus assembly is genome packaging. We have obtained mechanistic understanding of how the genomic RNA is packaged into virus particle by a virus packaging NTPase (Lisal et al., 2005; Kainov et al., 2006; Kainov et al., 2008). This packaging motor is structurally related to other hexameric helicases, which puts this discovery in a broader perspective.

6) How do viruses ensure their efficient replication in the host cell? We have obtained insight into this mechanism through the structure-function analysis of the non-structural proteins of different influenza virus strains (Kainov et al., 2010a). Moreover, we have recently gained insight into the structure of general transcription factor TFIIH, which is targeted by many viruses to block interferon production to ensure efficient replication (Kainov et al., 2008; Kainov et al., 2010b; Kainov et al., 2010c).

The record of successful scientific activity within this operation in the field of molecular mechanisms and interactions is strong. We claim that part of the current international discussion on the nature of the virosphere has arisen from our groundbreaking research. To strengthen the focus and to obtain a more comprehensive view of the virosphere we will explore new viruses and hosts from various medical and environmental niches: sepsis blood samples, nasopharyngeal aspirates, diabetic leg ulcer specimens, high salinity environments etc. The main focus will be on the conservation of viral structure and function across the entire virosphere.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

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

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.

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Doctoral training is an integral part of the RC, organised in a responsible fashion such that the student and supervisor maintain an open dialog identifying and developing skills to ensure the independence, and solid scientific excellence of the student at the completion of the Ph.D. process. All of the senior scientists contribute to doctoral training. This process is supported by active participation by the RC members at the community level (in Faculty work groups, Doctoral Programme boards, doctoral student selection, organisation of courses etc.). See below.

Recruitment and selection of doctoral candidates

Recruiting suitable doctoral candidates is fundamental for the success of the RC. Potential students have been recruited from both local sources and open international calls (9/22 students were from abroad), often with a short training period in the RC to assess ability, prior to application to a doctoral programme. The majority of doctoral candidates within the RC have participated in either national or local doctoral programmes (2 national and 3 local in the evaluation period), selected through rigorous, competitive processes (the success rate to the Viikki Doctoral Programme in Molecular Biosciences (VGSB), for example, is ~20%). This has assured not only that the students have been highly motivated and qualified, but also that the high scientific quality of the research project and the supervisor(s) has also been evaluated. Two of the RC members have been involved in graduate student selection committees for three different doctoral programmes during the evaluation period.

Supervision of doctoral candidates

The RC follows the formal guidelines of the doctoral programmes for supervision thus promoting the best possible practices. Students have had either one or two supervisors from within the RC. The supervisors are schooled in pedagogy, are at least associate professors, and are all active researchers prominent in the various fields of virology represented in the RC. All the students have been required to have thesis committees including at least two independent scientific advisors, to monitor interaction between the student and supervisor, and the progress of academic studies and scientific projects annually to promote the completion of the PhD within 4 years. Students have been encouraged to participate in all aspects of the scientific process from planning through to publication of results to ensure their independence at graduation. The students have all presented their own work in local seminar series, national and international conferences to promote their networking, discussion and presentation of results to the scientific community. When appropriate, the students have also carried out part of their research in other laboratories to learn new techniques, participate in collaborative projects and to broaden their horizons (10/22).
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Collaboration with faculties, departments/institutes, and potential schools/doctoral programmes

The RC is affiliated with the Faculty of Biological and Environmental Sciences which awards degrees, the Institute of Biotechnology (BI), and the Institute for Molecular Medicine Finland (FIMM). Members of the RC work in the Faculty on curriculum development committees, and in the research development committee which has an important role in developing the doctoral studies. The RC members have regularly examined doctoral dissertations, locally, nationally and internationally (~20) as well as serving on the thesis committees of students from five doctoral programmes. Through the VGSB, the Doctoral Programme of Biotechnology and Molecular Biology and the Helsinki Biomedical Doctoral Programme, the RC has collaborated in university-wide doctoral training over faculty and institute borders. The RC has had a central role on campus, organising research-based M.Sc. and Ph.D. graduate-level education, with courses open for all researchers at the campus and elsewhere. Nation-wide courses and international conferences have been organised or taught by the RC for the VGSB, the National Doctoral Programme in Informational and Structural Biology (ISB) and the National Doctoral Programme in Nanoscience. One such example is the international "Double-stranded RNA production for plant biotechnology" practical course with a companion workshop that had ~100 participants in September 2009.

A central aspect in the overall organisation of doctoral training in the RC has been the tight link to the local VGSB doctoral programme headed by the RC’s Prof. D. Bamford (VGSB director since 1.1.2008) and coordinated by Dr. Falck. The coordination of VGSB within the RC ensures structured and well-organised training of doctoral candidates, as well as implementation of good practices in doctoral training throughout the RC as a whole and within the campus.

Collaboration on doctoral training between the RC, faculties and doctoral programmes has led to improved procedures across campus that have streamlined graduate studies, ensuring that common practices are agreed upon between the doctoral programmes and the Faculties, such as the requirements for a thesis committee and the submission of a study plan.

Good practices and quality assurance in doctoral training

Good practice and quality assurance requires not only good recruitment, supervision and able students (outlined above), but also guidelines and regular critical independent evaluation of progress. Both the ISB and the VGSB handbook on good practices, [ISB from 2001, 5th edition 2010; VGSB from 2008, 1st edition], aim to explain the obligations and commitments of both doctoral students and research supervisors within the doctoral programme, and contain information and instructions on the application and reporting procedures for both students and research groups. They have clarified, along with the Faculty guidelines, the responsibilities and rights of the different actors in the doctoral programme and have served the whole RC in encouraging equality and fairness.

The research groups in the RC both in the Institute of Biotechnology and the Finnish Institute for Molecular Medicine undergo regular international evaluation, and the doctoral students are monitored by thesis committees. The Academy of Finland Centre of Excellence in Virus Research has its own international scientific advisory board and has been evaluated annually. The doctoral programmes have undergone biennial evaluation by the Academy of Finland.

Assuring good career perspectives for the doctoral candidates/fresh doctorates

The RC has provided top quality research training not just in many aspects of virology, but also in transferable skills such as presentation, ethics, assimilation of information, team-work, supervision, leadership, self-motivation, critical thinking and independence etc. this produces graduates who are attractive candidates for a variety of life science careers in both academia and industry. The supervisors provide mentoring during the PhD and afterwards on possible career choices, grant applications and job
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

applications as well as promoting their participation in international scientific networks to generate good employment opportunities. The RC has also had several active industrial collaborators and encourages students to consider careers in industry. The VGSB supports this through for example the "PhDs to Industry" project.

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

CONTINUES FROM BOX1

A clear strength in the practices and quality of doctoral training in the RC is that the training is well organized, support structures are in place and the research groups as well as doctoral programmes are subject to regular evaluation. The effort to make post-graduate studies, at the University level, more streamlined and incorporate all doctoral students into doctoral programmes is a challenge for the University as a whole, and the RC with VGSB will continue to be strongly engaged in this activity.

Another current effort by the RC is to expand and further internationalize its research training by participating in research training networks at European level. In the current EU FP7 Marie Curie People ITN call (FP7-PEOPLE-2011-ITN)  two separate large European proposals with RC members as partners (Denis Kainov & co with "BIFROST" and Dennis Bamford, Sandra Falck & co with "INSTRUCT-U") are taking part. The VGSB is currently also applying for an Erasmus Mundus Graduate School Network.

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).

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Our research on phage phi6 RNA polymerase and polymerase complex has led to several innovations in the field of biotechnology. The first products (enzymes for dsRNA production for RNAi) are available globally through Thermo Fisher Scientific Inc. There is one worldwide patent family and one patent application, which are based on this innovation.

Our scientific innovation in dsRNA production is the basis of a European Cooperation in Science and Technology (COST FA0806) action to control plant virus infections employing RNA-based vaccines. A proposal to develop new biotechnology platform for RNA-based vaccine production and delivery to plants has been submitted for evaluation (European Union Seventh Framework Theme 2 Cooperation Work Programme, topic KBBE2011.3.6-04). The RC coordinates this action which includes four industrial and four scientific partners from different parts of Europe. Obviously, development of vaccines to protect economically important crops against viral infections will have a positive impact on environment and on human health through increased food production.

The same technology platform has also been applied to study dsRNA induced innate immunity responses in human cells and to prevent enterovirus infections (Nygardas et al., 2009). This activity will be extended to additional viral systems (influenza virus and herpes simplex virus) in cell cultures and in animal disease models, thus probing the possibility to apply the phi6 based technology for the production of antiviral agents against major viral diseases (collaboration with Finnish National Institute for Health and Welfare).
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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We are developing highly advanced instrumentation for purification of large macromolecular complexes e.g., viruses using AFFF (asymmetric flow field fractionation) and monolithic chromatography. Development work of these new purification technologies are done in collaboration with industrial partners (manufacturers Postnova Analytics, Germany and Bia Separations, Slovenia, respectively), and these actions are strongly coupled with EU ESFRI INSTRUCT (An Integrated Structural Biology Infrastructure for Europe) operation. The developed technologies and designed instruments will be available for the scientific community via INSTRUCT and through public technical papers. The new developed purification tools will enhance our capacities to investigate novel viruses. Additionally, our new virus purification technologies, in particular, will open new avenues for research enhancing the change for new discoveries.

We use X-ray structures of viral proteins and their cellular counterparts to design low-molecular weight compounds that target virus-host interactions. This collaborative effort (Q-MOL L.L.C., San Diego, LA) has led to discovery of antiviral compounds that could in future reinforce the necessary therapeutic arsenal for control of influenza outbreaks and contribute to increasing Finnish competitiveness in the pharmaceutical sector providing a new line of innovative drugs.

Ways to strengthen the societal impact of the RC’s research and doctoral training.
CONTINUES FROM BOX1

The dissemination of scientific information and practices to the next generation of scientists and to the general public is a major outcome of our RC activity. The “PhDs to Industry” project provides training and employment for the students and encourages local businesses to employ them.

The VGSB students reach out to local high school students to encourage the next generation’s interest in molecular biosciences by arranging a popular annual practical course in biotechnology for them. The course covers the most common methods used in biotechnology research. It also includes visits to different laboratories on campus, and ends with a panel discussion on biotechnology. All partners have been very satisfied with the collaboration, and the course has achieved permanent status on the high schools’ curriculum with large numbers of students annually applying.

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

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The RC has coordinated a substantial national and international collaboration network (see list below) with eminent scientists and six industrial partners promoting multi- and interdisciplinary research as well as the integration of industry and science. We have published approximately 50 papers with our international collaborators during the evaluation period. Below we list both collaborators with whom we have joint publications and/or ongoing projects.

National* and international collaborators

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

RC-SPECIFIC STAGE 2 MATERIAL

Nicola Abrescia, CIC bioGUNE; Roger Burnett, The Wistar Institute; Wah Chiu, Baylor College of Medicine; Nynke Dekker, Delft Univ of Technology; Elizabeth Duke, Diamond Light Source; Ove Eriksson, Univ of Helsinki (UH); Stephen Fuller, Univ of Oxford (UO); Adrian Goldman, UH*; Jonathan Grimes, UO; Kay Grünewald, UO; Edward Haeggström, UH*; Daniel Hirschberg, UH*; Juha Huiskonen, UO, Lucienne Letellier, Université Paris-Sud; Erika Mancini, UO; Ritva Serimaa, UH*; Robert Sinkovits, Univ of California; David Stuart, UO; Roman Tuma, Univ of Leeds; Arnaud Poterszman, IGBMC, France.

# Genomics
Petri Auvinen, UH*; Roger Hendrix, Univ of Pittsburgh; Nisse Kalkkinen, UH*; Lars Paulin, UH*; Juho Rousu, UH*; Harri Saviähti, UH*

# RNA interference
Deyin Guo, Wuhan Univ; Veijo Hukkanen, Univ of Turku*; Ilkka Julkunen, National Institute for Health and Welfare*; Mart Saarma, UH*; Tuomas Tenkanen, Finzymes Ltd*;

# Evolution and taxonomy
Patrick Forterre, Pasteur Institute

# Microbiology
Jaana Bamford, Univ of Jyväskylä*; Robert Blankenship, Washington Univ; Donald Bryant, Pennsylvania State Univ; Rimantas Daugelavicius, Vytautas Magnus Univ; Terje Dokland, Univ of Alabama; Mike Dyall-Smith, Univ of Melbourne; Derrick Fouts, The J. Craig Venter Institute, Rockville; Timo Hyypiä, Univ of Turku*; Markku Kulomaa, Univ of Tampere*; Aharon Oren, The Hebrew Univ of Jerusalem; Christiana Potgieter, Deltamune; David Prangishvili, Institute Pasteur; Jakub Psencik, Charles Univ; Trevor Sewell, Univ of Cape Town; Kaarina Sivonen, UH*; Petri Susi, Univ of Turku*; Wouter Van Wyngaardt, Onderstepoort Veterinary Institute; Promega Corporation (USA)

# Methods for virus purification
Thorsten Klein, Postnova Analytics; Ales Strancar, Bia Separations

# Glycobiology and Lipids
Jerry Eichler, Ben Gurion Univ of the Negev; Jari Helin, Glykos Finland ltd.*; Perttu Permi, UH*; Pentti Somerharju, UH*; Pekka Lappalainen, UH*; Petri Kovanen, Wihuri Research Institute*

# Medical chemistry
Anton Cheltsov, Q-MOL L.L.C., San Diego, California;

# Nanotechnology
Arto Urtti, UH*; Heikki Tenhu, UH*; Susan Wiedmer, UH*

# Clinic
Hannimari Kallio-Kokko, Helsinki Univ Hospital, Laboratory Services (HUSLAB)*; Martti Vaara, Helsinki Univ Central Hospital*

The RC has several joint doctoral training activities with other universities. We have supervised students from the Univ of Wuhan (China), Vytautas Magnus and Vilnius Univer (Lithuania), and Univ of Jyväskylä (Finland). Although the majority
RC-SPECIFIC STAGE 2 MATERIAL

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

Of the students have had only one supervisor, several have had joint supervisors within the RC. The RC has organized courses and conferences for doctoral students in cooperation with the graduate schools, and supported mobility of students through travel grants from the VGSB. All researchers are encouraged to visit and host collaborators, to participate in at least one international conference per year, and to frequently accept invitations to give keynote talks in other institutes, conferences and workshops. We have also hosted ERASMUS students.

With such a broad network of interactions, much time and effort is spent on joint funding applications, visits, and negotiations. The collaborative network changes dramatically depending on the funding opportunities, common scientific activities and the composition of the RC. We are involved in running a national core facility in cryo-electron microscopy, a European Union COST and the ESFRI program INSTRUCT, that will promote the mobility of researchers. We will continue to search for industrial partners for technology development.

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).

This application is filled according to the instructions given when the call was opened. To our surprise, the format was changed later during the process unabling the usage of already written report. Consequently, we allowed the text to overflow to the second box.

Our RC is a joint operation between the Institute of Biotechnology and Department of Biosciences at the Viikki campus as well as with the Institute for Molecular Medicine Finland (FIMM) at the Meilahti campus. On both campuses there are excellent core facilities including DNA sequencing, genomics and microarray services, protein chemistry and proteomics services as well as crystallization facilities. As part of the Electron microscopy core facility at the Institute of Biotechnology we are operating and developing a cryo-electron microscopy facility (responsible PI Professor Sarah Butcher). Funded as one of the centers in the EU-FP7 program “An Integrated Structural Biology Infrastructure for Europe” (INSTRUCT) we have set up a major virus production and centrifugation-based purification facility.

Our RC is a multidisciplinary organization involving wide range of powerful technologies available either in-house or through collaboration. We are in the forefront in developing cutting-edge structural biology methods towards in vivo technologies. This type of method development is of course a high risk project. Also, the equipment at the cutting-edge of technologies for today’s structural biology is expensive to build and maintain and will become more so in the future.

The efforts put in the development of a world class center for virus research has been considerable. This includes the trained people and research infrastructures. As the funding bases for the operation is dynamic we actively search for funding to maintain the research potential. Consequently a number of major grant applications are in the evaluation process as described above. One additional action is to train the senior scientists to participate in these processes to prepare them for independent actors (career development).
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC STAGE 2 MATERIAL

Both Ph.D. and M.Sc. teaching have been fully integrated into our multidisciplinary research activities. Due to this integration it is impossible to make numeric estimates of research and teaching. In addition we do also organize undergraduate virology teaching at our campus as indicated in section 2.

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

See above

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.

THIS APPLICATION IS FILLED ACCORDING TO THE INSTRUCTIONS GIVEN WHEN THE CALL WAS OPENED. TO OUR SURPRISE, THE FORMAT WAS CHANGED LATER DURING THE PROCESS UNABLING THE USAGE OF ALREADY WRITTEN REPORT. CONSEQUENTLY, WE ALLOWED THE TEXT TO OVERFLOW TO THE SECOND BOX.

The members of this RC are previous or current members of two consecutive national centers of excellence (CoE in Structural Virology, 2000-2005; CoE in Virus Research, 2006-2011). Consequently, and as also requested by Academy of Finland, there has been a well organized management system with a Director and a Vice Director coordinating the administrative and operational activities with support from the university financial and human resource personnel. The scientific management is stratified so that the strategic decisions have been made by the PIs, the individual projects are then managed by the PIs with the respective project members all contributing towards the scientific process. This has helped in training the postdoctoral fellows and the Ph.D. students in project management. Due to the wide knowledge base and multidisciplinary expertise within the RC, it has been possible to join forces on collaborative projects where the outcome has been much more than any group could have separately been able to achieve. Altogether 64 such collaborations between the PIs took place during the evaluation period that led to scientific publications illustrating the coherence within the RC. The success of the leadership and science has been evaluated during annual meetings with our international Scientific Advisory Board (SAB) together with university and Academy representatives.

This has contributed to our excellent research quality. The SAB reports have been very positive revealing that our CoE has been particularly coherent and focused both scientifically and administratively. In addition to the CoE SAB, we have been supported by regular research evaluation by Institute of Biotechnology SAB during the evaluation period. As all the members of RC focus on different aspects of virology it has been possible to generate joint research activities and to reach highest scientific standard in our field of expertise. The RC members have contributed to novel ideas on how the entire virus universe is organized and how it evolves. These observations challenge the way viruses are currently classified. The administration of our extensive international research network has been a very important part of our management strategy. For instance, we have coordinated the exchange of persons between our collaborating laboratories for all levels of researchers, and we have spent a considerable amount of time in extensive discussions with our collaborators to ensure the smooth progression of the research. The current CoE is coming to an end this year. Of the four PIs from the start of the current CoE, one has moved to University of Jyväskylä as Professor in Molecular Biology and one to University of Leeds, U.K. to take up a tenured position as Reader in Biophysics. A third has been promoted to a professorship at
Helsinki University. The remaining two PIs in Helsinki have broadened their research networks as part of a strategy for renewal.

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

CONTINUES FROM BOX1

This means that the RC in virus research will continue with more junior members taking up management positions. The practice with joint projects between the PIs will continue. Hence in terms of management in the future, the collaborations will be promoted through joint seminars, funding applications, and discussions. The RC members are currently in three, stage-two CoE applications to the Academy of Finland, one in virus research, one in protein and lipid biology, and one in pharmaceutical nanotechnology. These initiatives are backed by new active collaborations bringing in not only new national and international consortia, but also strengthening the existing collaborations.

One important management responsibility is the Viikki Doctoral Programme providing structured doctoral training (annual average 40 students working in different research groups of the campus). This activity is directed by Professor D. Bamford and coordinated by Dr. Sandra Falck. For these activities the Ministry of Education and Culture has allocated 4 444 000 €.

### 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: 2748000

- **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: 25000

- **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: 25000

- **European Research Council (ERC)** - total amount of funding (in euros) ERC has decided to allocate to the RC members during 1.1.2005-31.12.2010: 0

- **International and national foundations** - names of international and national foundations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros).
  - names of the foundations: Sigrid Juselius, Jane ja Aatos Erkko
  - total amount of funding (in euros) from the above-mentioned foundations: 446000

- **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:
• **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: Ministry of Education and Culture
  - total amount of funding (in euros) from the above-mentioned funding organizations: 5324000

### 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 scientific focus is formulated as described in section 6. The efforts toward high quality doctoral training are described in section 2. The resources needed to carry out these activities depend on external funding. To ensure continuation of the research and doctoral training at high international level the PIs of the RC are actively applying research and doctoral programme funding. The major research related applications include three Center of Excellence applications, which have pass through to the second stage in the Academy of Finland evaluation, one pending application for Academy Professor, two pending applications for Academy Research Fellows, one pending application for an Academy Postdoctoral Fellow, two pending applications for Academy Research grants, one pending application for European Union Seventh Framework, one pending application to the Sigrid Juselius Foundation. The major pending applications related to graduate student training include two European Union Seventh Framework Marie Curie People ITN applications ("BIFROST" and "INSTRUCT-U").

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

The text and statistics have been composed and checked by Prof. Dennis Bamford, Prof. Sarah Butcher, Dr. Sandra Falck, Dr. Denis Kainov, Dr. Hanna Oksanen, Dr. Minna Poranen and Dr. Elina Roine with approximately equal contributions.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CoE_VIRRES/Bamford

1 Analysis of publications

- Associated person is one of Dennis Bamford, Dennis.Bamford@helsinki.fi, Jaana Bamford, Sarah.Butcher , Sarah.Butcher@helsinki.fi, Hanna Oksanen, Hanna.oksanen@helsinki.fi, Monna Poranen, Monna.Poranen@helsinki.fi, Elina Roine, Elina.Roine@helsinki.fi, Denis Kainov, denis.kainov@helsinki.fi, denis.kainov@fimm.fi, Roman Tuma, roman.tuma@helsinki.fi, Janne Ravantti, Janne.Ravantti@helsinki.fi, Juha Huiskonen, Harri.Jalkanen, harri.jalkanen@helsinki.fi, Ari Ora, ari.ora@helsinki.fi, Katarena Hattula, katarena.hattula@helsinki.fi, Galija Ziedaite, galija.ziedaite@helsinki.fi, Anna Domanska, stafa.vien@helsinki.fi, Violeta Manole, violeta.manole@helsinki.fi, Lotta Happonen, Lotta.Happonen@helsinki.fi, Jani Salmi, Jani.salmi@helsinki.fi, Jani.isalo@helsinki.fi, Leila Liimons, leila.liimons@helsinki.fi, Bohumil Suchanovska, Sandra Patc, sandra.patc@helsinki.fi, Andrey Golubtsov, Andrey.Golubtsov@helsinki.fi, Puwe Yuan, puwe.yuan@helsinki.fi, Maria Anastasina, maria.anastasina@helsinki.fi, Nelli Johanna Karhu, simonas.laurinavicius@helsinki.fi, Andris Uzans, Andris.Uzans@helsinki.fi, Ants Pekka Auto, ants.auto@helsinki.fi, Juha Peter Sainio, peter.sainio@helsinki.fi, Nina Alakoskela, nina.alakoskela@helsinki.fi, Maija Kaarina Pietilä, maija.pietila@helsinki.fi, Mart Krupovic, mart.krupovic@helsinki.fi, Petra Kukkar

<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>
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<tbody>
<tr>
<td>A1 Refereed journal article</td>
<td>20</td>
<td>15</td>
<td>22</td>
<td>16</td>
<td>22</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>A2 Review in scientific journal</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>A3 Contribution to book/other compilations (refereed)</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>A4 Article in conference publication (refereed)</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 Contribution to book/other compilations (non-refereed)</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3 Unrefereed article in conference proceedings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</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></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
2 Listing of publications

A1 Refereed journal article

2005

Bamford, DH, Grimes, JM, Stuart, DI 2005, 'What does structure tell us about virus evolution?', *Current Opinion in Structural Biology*, vol 15, no. 6, pp. 655-663.


Gaidelyte, A, Jääsni, ST, Daugelavicius, R, Bamford, JKH, Bamford, DH 2005, 'The linear double-stranded DNA of phage Bam35 enters lysogenic host cells, but the late phase functions are suppressed', *Journal of Virology*, vol 81, no. 10, pp. 3521-3527.


Lautrimoki, PA, Huiskonen, JT, Bamford, DH, Butcher, SJ 2005, 'Membrane proteins modulate the bilayer curvature in the bacterial virus Bam35', *Structure*, vol 13, no. 12, pp. 1819-1828.


CoE_VIRRES/Bamford

2006


Ruokoranta, TM, Grahn, AM, Ravnantti, JJ, Poranen, MM, Bamford, DH 2006, 'Complete genome sequence of the broad host range single-stranded RNA phage PR11 places it in the Levivirus genus with characteristics shared with alloleviviruses', Journal of Virology, vol 80, no. 18, pp. 9328-9330.


2007


Euryarchaeota', Krupovic, M, Bamford, DH
Jäälniö, HT, Huiskonen, JT, Butter, SJ 2007, 'Identification and functional analysis of the Rz/Rz1-like accessory lysis genes in PM2', Molecular Microbiology, vol 64, no. 6, pp. 1635-1648.
2008
CoE_VIRRES/Bamford


2009


Kukkonen, P, Bamford, DH 2009, 'Virus-host interactions in environments with a wide range of ionic strengths', Environmental microbiology reports, vol 1, no. 1, pp. 71-77.
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

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2010


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CoE_VIRRES/Bamford


A2 Review in scientific journal

2005


2006


2008


2009


2010


A3 Contribution to book/other compilations (refereed)

2005


2006
CoE_VIRRES/Bamford

Bamford, D, Bamford, J 2006, 'Lipid-containing bacteriophage PM2, the type-organism of Corticoviridae', in R Calendar, S Abedon (eds), The Bacteriophages, 2 edn, New York, Oxford University Press, pp. 171-174.


2008


2009

Bamford, D 2009, 'Synteettinen elämä', in I Hanski, I Niiniluoto, I Hetemäki (eds), Kaikki evoluutiosta, Gaudeamus.

2010


A4 Article in conference publication (refereed)

2005


Tuma, R, Tsuruta, H, Prevelige, P, Kainov, D, Poranen, M, Bamford, D 2005, 'In vitro assembly of bacteriophages: folding, kinetic control and intermediates.', Computational and mathematical methods in medicine : CMMM. 6 2 TAYLOR & FRANCIS,.

2007


2009


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

2008


8
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

CoE_VIRRES/Bamford

B3 Unrefereed article in conference proceedings

2007

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

2010
## Analysis of activities 2005-2010

<table>
<thead>
<tr>
<th>Activity type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor or co-supervisor of doctoral thesis</td>
<td>30</td>
</tr>
<tr>
<td>Prizes and awards</td>
<td>15</td>
</tr>
<tr>
<td>Editor of research journal</td>
<td>6</td>
</tr>
<tr>
<td>Peer review of manuscripts</td>
<td>25</td>
</tr>
<tr>
<td>Assessment of candidates for academic posts</td>
<td>4</td>
</tr>
<tr>
<td>Membership or other role in review committee</td>
<td>7</td>
</tr>
<tr>
<td>Membership or other role in research network</td>
<td>10</td>
</tr>
<tr>
<td>Membership or other role in national/international committee, council, board</td>
<td>15</td>
</tr>
<tr>
<td>Membership or other role in public Finnish or international organization</td>
<td>16</td>
</tr>
<tr>
<td>Other tasks of an expert in private sector</td>
<td>2</td>
</tr>
<tr>
<td>Participation in interview for written media</td>
<td>7</td>
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<td>Participation in radio programme</td>
<td>4</td>
</tr>
</tbody>
</table>
2 Listing of activities 2005-2010

Supervisor or co-supervisor of doctoral thesis

**Dennis Bamford**, Dennis.Bamford@helsinki.fi

- Supervisor of Doctoral thesis, Dennis Bamford, 2006 → 2010
- Supervisor of Doctoral thesis, Dennis Bamford, 2008 → 2010

**Jaana Bamford**


**Sarah Butcher**, Sarah.Butcher@helsinki.fi

- Ph.D. thesis supervisor of Harri Jäänilinna, Sarah Butcher, 01.10.2002 → 16.02.2007, Finland
- Ph.D. thesis supervisor of Jari Seitsinen, Sarah Butcher, 08.08.2006 → 18.02.2011, Finland
- Ph.D. thesis supervisor of Violeta Manole, Sarah Butcher, 01.01.2007 → ..., Finland
- Ph.D. thesis supervisor of Lotta Happonen, Sarah Butcher, 01.01.2008 → ..., Finland
- Ph.D. thesis supervisor of Lassi Liljeroos, Sarah Butcher, 01.01.2009 → ..., Finland

**Hanna Oksanen**, Hanna.oksanen@helsinki.fi

- Supervision of PhD thesis of Jenni Karttunen, Hanna Oksanen, 2007 → ..., Finland
- Supervision of PhD thesis of Sari Mäntynen, Hanna Oksanen, 2009 → ..., Finland
- Supervision of PhD thesis of Nina Atanasova, Hanna Oksanen, 2010 → ..., Finland

**Minna Poranen**, Minna.Poranen@helsinki.fi

- Supervision of PhD thesis of Antti Alto, Minna Poranen, 2007 → 2010, Finland
- Supervision of PhD thesis of Peter Satin, Minna Poranen, 2007 → 2010, Finland
- Supervision of PhD thesis of Xiaoyu Sun, Minna Poranen, 2010 → ..., Finland

**Elina Roine**, Elina.Roine@helsinki.fi

- Supervision of doctoral thesis, Elina Roine, 01.01.2007 → 31.12.2007, Finland
- Supervision of doctoral thesis of Petra Kukkaro, Elina Roine, 2007 → 2009, Finland

**Denis Kainov**, denis.kainov@helsinki.fi, denis.kainov@fimm.fi

- Thesis supervision, Denis Kainov, 2010 → 2013, Finland

**Roman Tuma**, roman.tuma@helsinki.fi

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

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

CoE_VIRRES/Bamford

Prizes and awards
Dennis Bamford, Dennis.Bamford@helsinki.fi
Director of Program on Structural Virology a National Center of Excellence, Dennis Bamford, 2000 → 2005
Academy Professor, Dennis Bamford, 2002 → 2007
2006 Prize for scientific innovation, University of Helsinki, Dennis Bamford, 2005 →...
Commander of the order of the Finnish Lion, Dennis Bamford, 2008
Director of Finnish Center of Excellence in Virus Research, Dennis Bamford, 2010 → 2014
EU ESFRI INSTRUCT Associate Center Director, Dennis Bamford, 2010 → 2014

Minna Poranen, Minna.Poranen@helsinki.fi
Excellence in Master Thesis Supervision Award, 2005, Minna Poranen, 23.02.2006, Finland

Denis Kainov, denis.kainov@helsinki.fi, denis.kainov@fimm.fi
First Prize for the Best Doctoral Thesis, University of Helsinki, Denis Kainov, 2006, Finland
Young scientist’s award, Denis Kainov, 2006, Japan

Violeta Manole, violeta.manole@helsinki.fi
Viikki Graduate School in Biosciences Fellowship, Violeta Manole, 01.01.2007 → 01.01.2011, Finland
FEMS Young Scientist Meeting Grant (YSMG), Violeta Manole, 08.09.2009, Netherlands

Lotta Happonen, Lotta.Happonen@helsinki.fi
Helsingin Yliopiston HEBIOT-koulutusohjelma 800 euroa, Lotta Happonen, 14.02.2007
Helsingin Yliopiston Juurahaston matka-apuraha 2500 euroa, Lotta Happonen, 26.03.2009
Jatko-opinnot, Lotta Happonen, 01.01.2009 → 31.12.2011, Finland

Jani Seitsonen, jani.seitsonen@helsinki.fi
National Doctoral Programme in Informational and Structural Biology (ISB) Fellowship, Jani Seitsonen, 22.05.2006 → 22.05.2010

Editor of research journal
Dennis Bamford, Dennis.Bamford@helsinki.fi
Member of editorial board of Journal of General Virology, Dennis Bamford, 2006 → 2010
Member of editorial board of Journal of Virology, Dennis Bamford, 2006 → 2011
Sarah Butcher, Sarah.Butcher@helsinki.fi
Journal of Structural Biology, member of editorial board, Sarah Butcher, 2010 → ...
Roman Tuma, roman.tuma@helsinki.fi
Biophysical Journal, Roman Tuma, 01.01.2006 → 31.12.2006
Journal of Molecular Biology, Roman Tuma, 01.01.2006 → 31.12.2006
Virology, Roman Tuma, 01.01.2006 → 31.12.2006

Peer review of manuscripts
Dennis Bamford, Dennis.Bamford@helsinki.fi
Reviewer, Archives in Virology, Dennis Bamford, 2005 → 2010
Reviewer, Biochemistry, Dennis Bamford, 2005 → 2010
Reviewer, Cell, Dennis Bamford, 2005 → 2010
Reviewer, EMBO Journal, Dennis Bamford, 2005 → 2010
Reviewer, European Journal of Biochemistry, Dennis Bamford, 2005 → 2010
Reviewer, FEMS Microbiology Letters, Dennis Bamford, 2005 → 2010
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CoE_VIRRES/Bamford

Reviewer, Gene, Dennis Bamford, 2005 → 2010
Reviewer, Journal of Bacteriology, Dennis Bamford, 2005 → 2010
Reviewer, Journal of General Virology, Dennis Bamford, 2005 → 2010
Reviewer, Journal of Molecular Biology, Dennis Bamford, 2005 → 2010
Reviewer, Journal of Virology, Dennis Bamford, 2005 → 2010
Reviewer, Microbiology, Dennis Bamford, 2005 → 2010
Reviewer, Molecular Cell, Dennis Bamford, 2005 → 2010
Reviewer, NAR, Dennis Bamford, 2005 → 2010
Reviewer, Nature, Dennis Bamford, 2005 → 2010
Reviewer, Nature Reviews in Microbiology, Dennis Bamford, 2005 → 2010
Reviewer, PNAS, Dennis Bamford, 2005 → 2010
Reviewer, Plasmid, Dennis Bamford, 2005 → 2010
Reviewer, RNA, Dennis Bamford, 2005 → 2010
Reviewer, Science, Dennis Bamford, 2005 → 2010
Reviewer, Virology, Dennis Bamford, 2005 → 2010

Sarah Butcher, Sarah.Butcher@helsinki.fi

Journal of Structural Biology reviewer, Sarah Butcher, 2006, United States
Structure reviewer, Sarah Butcher, 2008, United States
Journal of Molecular Biology, reviewer, Sarah Butcher, 2010
Journal of Virology, reviewer, Sarah Butcher, 2010

Assessment of candidates for academic posts

Sarah Butcher, Sarah.Butcher@helsinki.fi

Associate Professor application for Oulu University, Sarah Butcher, 2007, Finland
Doctoral positions in GSBM, evaluator, Sarah Butcher, 2009, Finland
Doctoral positions in ISB, evaluator, Sarah Butcher, 2009, Finland
Postdoctoral positions in University of Helsinki, evaluator, Sarah Butcher, 2010

Membership or other role in research network

Sarah Butcher, Sarah.Butcher@helsinki.fi

Biocentrum Helsinki member, Dennis Bamford, 1995 → 2013
EMBO member, Dennis Bamford, 2006 → ...
Honorary Member of Societas Biochemica, Biophysica et Microbiologica Fenniae, Dennis Bamford, 2006 → ...
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

CoE_VIRRES/Bamford

Member of European co-operation in science and technology, Dennis Bamford, 2009 → 2013

Hanna Oksanen, Hanna.oksanen@helsinki.fi

Member of Societas biochemica, biophysica et microbiologica Fenniae, Hanna Oksanen, 2000 → ...

Member of Vilikki Research Groups in Biosciences, Hanna Oksanen, 2009 → ..., Finland

Minna Poranen, Minna.Poranen@helsinki.fi

Member of Societas Biologica Fennica Vanamo, Minna Poranen, 1992 → 2011, Finland

Member of Societas Biochemica, Biophysica et Microbiologica Fenniae, Minna Poranen, 1995 → 2011, Finland

Member of Vilikki Research Groups in Biosciences, Minna Poranen, 2010 → ..., Finland

Elina Roine, Elina.Roine@helsinki.fi


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

Dennis Bamford, Dennis.Bamford@helsinki.fi

SAB member of UNESCO Associated Center of Excellence, Dennis Bamford, 2000 → 2005

Board member of Arts Foundation, Dennis Bamford, 2004 → 2005

Faculty Council Member, Faculty of Biosciences, Univ of Helsinki, Dennis Bamford, 2004 → 2009

Member of the fellowship fund board, Dennis Bamford, 2004 → 2010

Chairman of Arts Foundation, Dennis Bamford, 2005

Evaluation board member of EMBL Hamburg outstation, Dennis Bamford, 2007

Evaluation board member for structured PhD education, Irish higher education authority, Dennis Bamford, 17.11.2009 → 19.11.2009

Scientific committee member, An institute Pasteur Meeting, Dennis Bamford, 21.06.2010 → 25.06.2010

Sarah Butcher, Sarah.Butcher@helsinki.fi

Member of Biocenter Finland Imaging Board, Sarah Butcher, 01.2007 → 12.2007, Finland

Member of Biocenter Finland Structural Biology Board, Sarah Butcher, 08.2008 → 2013, Finland

Biocenter Finland Working Group Member, Sarah Butcher, 08.2008, Finland

Board member Institute of Biotechnology, Sarah Butcher, 2010 → 2013, Finland

Elena Roine, Elina.Roine@helsinki.fi

Membership, Elina Roine, 2009 → 2011

Roman Tuma, roman.tuma@helsinki.fi

Biophysical Society, Roman Tuma, 01.01.2006 → 31.12.2006

Membership or other role in public Finnish or international organization

Dennis Bamford, Dennis.Bamford@helsinki.fi

Member of Societas Genetica Fennica, Dennis Bamford, 1974 → ...

Member of The Scandinavian Association of Geneticists, Dennis Bamford, 1975 → ...

Member of Societas Biochemica, Biophysica et Microbiologica Fenniae, Dennis Bamford, 1977 → ...

Member of American Society of Microbiology, Dennis Bamford, 1978 → ...

Member of American Association of Advancement of Science, Dennis Bamford, 1992 → ...

President of Societas Biochemica, Biophysica et Microbiologica Fenniae, Dennis Bamford, 1999 → 2005

Chairman of Research Group Organization in Molecular Biosciences, Univ of Helsinki, Dennis Bamford, 2000 → 2006

Steering group member of Vilikki Graduate School in Biosciences, Dennis Bamford, 2000 → ...
INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

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

CoE_VIRRES/Bamford

Member of Finnish Academy of Science and Letters, Dennis Bamford, 2002 → ...
Chairman of EU ESFRI INSTRUCT Working Group, Dennis Bamford, 2008 → 2009

Sarah Butcher , Sarah.B butcher@helsinki.fi

Society for General Microbiology, Sarah Butcher, 01.01.2001 → 31.12.2011, United Kingdom
Societas Biochemica, Biophysica et Microbiologia Fenniae, Sarah Butcher, 01.01.2004 → 31.12.2011, Finland
Biocentrum Helsinki member, Sarah Butcher, 2007 → 2013, Finland
Science, Engineering and Technology Routes University Ambassador for Women in Science, Sarah Butcher, 2007 → 2009, Finland
Member of the American Society for Microbiology, Sarah Butcher, 2010, United States

Denis Kainov , denis.kainov@helsinki.fi , denis.kainov@fimm.fi

Member of Societas Biochemica, Biophysica et Microbiologica Fenniae, Denis Kainov, 2010 → ..., Finland

Other tasks of an expert in private sector

Minna Poranen , Minna.Poranen@helsinki.fi

Consulting biotechnology company Finszymes, Minna Poranen, 2004 → 2010, Finland
Consulting biotechnology company Thermo Fisher Scientific, Minna Poranen, 2010 → ...

Participation in interview for written media

Dennis Bamford , Dennis.Bamford@helsinki.fi

Kansanterveys-lehti, Dennis Bamford, 08.2007, Finland
New Scientist Interview, Sarah Butcher, 2006, United Kingdom
Professorial inauguration, Sarah Butcher, 03.12.2008, Belgium
New Scientist Interview, Sarah Butcher, 11.03.2009, United Kingdom

Minna Poranen , Minna.Poranen@helsinki.fi

Savon Sanomat: Luonnon Ystävät perusti suurapurahan, Minna Poranen, 05.05.2008, Finland
Savon Sanomat: Virustutkimus vaatii pitkäaikaista tukea, Minna Poranen, 05.05.2008, Finland

Anders Wallin , Anders.Wallin@helsinki.fi


Participation in radio programme

Dennis Bamford , Dennis.Bamford@helsinki.fi

YLE Teema Lähikuvassa Dennis Bamford, Dennis Bamford, 31.08.2007, Finland
YLE Radio Suomi Lähikuvassa Dennis Bamford, Dennis Bamford, 15.12.2008, Finland
YLE Radio 1 Vuoden 2009 Nobelin palkinnot Episode, Dennis Bamford, 14.10.2009, Finland

Sarah Butcher , Sarah.B butcher@helsinki.fi

YLE 1 aamuradio, Sarah Butcher, 2006, Finland
Research Group: Bamford D

**Basic statistics**

- Number of publications (P) 123
- Number of citations (TCS) 704
- Number of citations per publication (MCS) 5.76
- Percentage of uncited publications 19%
- Field-normalized number of citations per publication (MNCS) 0.83
- Field-normalized average journal impact (MNJS) 1.45
- Field-normalized proportion highly cited publications (top 10%) 0.45
- Internal coverage 0.88

**Trend analyses**

- MNCS
- THCP10
- MNJS

**Collaboration**

- Performance (MNCS) by collaboration type
Research profile

Threshold: P ≥ 5