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HELSINGIN YLIOPISTO HELSINGFORS UNIVERSITET UNIVERSITY OF HELSINKI

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

RC-Specific Evaluation of ViiGen – Viikki Genome Biology Research Community

Seppo Saari & Antti Moilanen (Eds.)



Evaluation Panel: Biological, Agricultural and Veterinary Sciences

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Seppo Saari & Antti Moilanen

Title:

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International Evaluation of Research and Doctoral Training at the University of Helsinki 2005–2010 : RC-Specific Evaluation of ViiGen – Viikki Genome Biology Research Community

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:

Main scientific field of research:

Biological, Agricultural and Veterinary Sciences

RC-specific keywords:

functional genomics, bioinformatics, ecological genomics, metagenomics, plant genomics

Participation category:

4. Research of the participating community represents an innovative opening

RC's responsible person:

Helariutta, Yrjö

Keywords:

Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community

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Foreword

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

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

This evaluation enabled researchers to define RCs from the "bottom up" and across disciplines. The aim of the evaluation was not to assess individual performance but a community with shared aims and researcher-training activities. The RCs were able to choose among five different categories that characterised the status and main aims of their research. The steering group considered the process of applying to participate in the evaluation to be important, which 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 Kristiina 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 biochemi 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-evaluation¹ and traditional research assessment exercise and its focus is both on the research outcomes and procedures associated with research and doctoral training. The approach to the evaluation is enhancement-led where self-evaluation constituted the main information. The answers to the evaluation questions formed together with the information of publications and other scientific activities an entity that was to be reviewed as a whole.

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

1.2 Aims and objectives in the evaluation

The aims of the evaluation are as follows:

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

1.3 Evaluation method

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

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

² <u>Policies on doctoral degrees and other postgraduate degrees at the University of Helsinki</u>.

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. TUHAT³ compilations on publications and other scientific activities⁴
- 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: <u>1998</u> and <u>2005</u>

The Finnish Universities/Research Institutes

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

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

1.6 Evaluation questions and material

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

1. Focus and quality of the RC's research

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

 Identification of the ways to strengthen the focus and improve the quality of the RC's research The additional material: TUHAT compilation of the RC's publications, analysis of the RC's publications data (provided by University of Leiden and the Helsinki University Library)

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

- Strengths
- Areas of development
- Other remarks
- Recommendations

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

2. Practises and quality of doctoral training

- Organising of the doctoral training in the RC. Description of the RC's principles for:
- recruitment and selection of doctoral candidates
- supervision of doctoral candidates

- collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes

- good practises and quality assurance in doctoral training
- assuring of good career perspectives for the doctoral candidates/fresh doctorates
- Identification of the RC's strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.

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

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

- Strengths
- Areas of development
- Other remarks
- Recommendations

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

3. The societal impact of research and doctoral training

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

The additional material: TUHAT compilation of the RC's other scientific activities. A written feedback from the aspects of: societal impact, national and international collaboration, innovativeness

- Strengths
- Areas of development
- Other remarks
- Recommendations

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

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

Description of

- the RC's research collaborations and joint doctoral training activities - how the RC has promoted researcher mobility
- Identification of the RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.
- A written feedback from the aspects of: scientific quality, national and international collaboration
 - Strengths
 - Areas of development
 - Other remarks
 - Recommendations

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

5. Operational conditions

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

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

- Strengths
- Areas of development
- Other remarks
- Recommendations

6. Leadership and management in the researcher community

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

7. External competitive funding of the RC

- The RCs were asked to provide information of such external competitive funding, where:
 - the funding decisions have been made during 1.1.2005-31.12.2010, and
 - the administrator of the funding is/has been the University of Helsinki
- On the e-form the RCs were asked to provide:

1) The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation , EU, ERC, foundations, other national funding organisations, other international funding organisations), and

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

Competitive funding reported in the text is also to be considered when evaluating this point. A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness, future significance

- Strengths
- Areas of development
- Other remarks
- Recommendations

8. The RC's strategic action plan for 2011–2013

RC's description of their future perspectives in relation to research and doctoral training.
 A written feedback from the aspects of: scientific quality, scientific significance, societal Impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance

- Strengths
- Areas of development

- Other remarks
- Recommendations

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

The RC's fitness to the chosen participation category

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

- Strengths
- Areas of development
- Other remarks
- Recommendations

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

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

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

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

13. RC-specific conclusions

1.7 Evaluation criteria

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

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

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

Description of criteria levels

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

Classification: Criteria (level of procedures and results)

Outstanding quality of procedures and results (5)

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

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

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

Excellent quality of procedures and results (4)

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

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

Very good quality of procedures and results (3)

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

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

Good quality of procedures and results (2)

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

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

Sufficient quality of procedures and results (1)

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

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

Question 2 – DOCTORAL TRAINING Question 3 – SOCIETAL IMPACT Question 4 – COLLABORATION

Classification: Criteria (level of procedures and results)

Outstanding quality of procedures and results (5)

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

Excellent quality of procedures and results (4)

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

Very good quality of procedures and results (3)

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

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

Good quality of procedures and results (2)

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

Sufficient quality of procedures and results (1)

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

Question 9 – CATEGORY

Participation category - fitness for the category chosen

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

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

An example of outstanding fitness for category choice (5) 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)
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- Excellent (4)
- Very good (3)
- Good (2)
- Sufficient (1)

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

⁵ The panels discussed the category fitness and made the final conclusions of the interpretation of it.

1.8 Timetable of the evaluation

The main timetable of the evaluation:

- 1. Registration
- 2. Submission of self-evaluation materials
- 3. External peer review
- 4. Published reports
 - University level public report
 - RC specific reports

November 2010 January-February 2011 May-September 2011 March-April 2012

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 new RC in genome biology, ViiGen, is quite different from the other RCs and stems from the technological revolution in genomics, in particular massive parallel sequencing (MPS). MPS has enormous impact in many diverse fields of life sciences and this RC reflects the broad impact of these technologies. Genomics technology is here represented by the state-of-the-art genomics core unit at Viikki campus (headed by Petri Auvinen), equipped with the most recent instrumentations including already funded single molecule sequencing instrumentation, and thereby further consolidating its pioneer and leading role in sequencing infrastructure in Finland. The coordinator and most of the other co-PIs are more devoted to the use of the genomics tools in their particular field and hence the use of technology is the common denominator of this RC.

The group members, working in different fields and with different acknowledged as well as new, emerging model organisms ranging from bacteria over plants to animals, have impressive track records in their particular field (about 5-6 international papers / year for each team). They will definitely take full advantage of the new tools. The full impact of their work and their contribution to this still young RC will be more evident in the future as this RC is maturing and the field is developing. It is also clear from many of the other RCs at the University of Helsinki (UH) that a genomics facility has an important role to play in present and future research. We believe that access to the new genomic tool-box will be an increasing and significant contribution to the activities at the Viikki campus and UH. The PIs and co-PIs demonstrate this adequately by their own ongoing and planned work.

Yet the RC will have a challenge in the future - how should progress in terms of knowledge and bioinformatics tools be shared within the RC and among other RCs at the campus? In addition to build and keep the sequencing infrastructure updated, also increased efforts will have to be put into the establishment of the necessary overarching bio-informatics. Furthermore, the latter will have to range effectively and be structured as such, from providing daily/routine/servicing type of bio-informatics (e.g. transforming SAM/BAM files in simple excel sheets for the researcher) to RC-coordinated introduction and perhaps even development of new tools in bio-informatics. Some measures are proposed to channel knowledge about genome technologies and these are quite appropriate (meeting series, graduate schools, courses etc), but perhaps hands-on courses should be more emphasized here. Taken together, technical aspects and limitations of the new equipment and tools is one side of the coin, but the other side is bioinformatics. The panel believes that the necessary concerted action in bio-informatics is less well described although it is a crucial step to leverage the technical platform. A bio-informatics core could be appropriate that establishes power user groups within the campus as an efficient strategy to collect the groups working in different fields of genome technology. However, care should be taken not to let such core develop into a team of bio-informaticians that only care about developing new algorithms and do research only in fact, which is often what happens at other institutes or clusters of these. This particular RC has wide competence in several of these fields and could also be coordinator for several sub-groups to ensure also state-of-the-art knowledge transfer as well as establishment of a well-coordinated userfriendly servicing type of bio-informatics division that offers fast and smooth access to the daily user. Along these lines the panel sees a need to coordinate these efforts with other omics efforts, and it is quite likely that system approaches will become even more interesting within the following years to complement genomics efforts.

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

At present, the seven PIs provide their own pathway for recruitment, supervision etc, as the PIs do not share a common topic and the students many times belong to different graduate schools (molecular bioscience, medicine, computational science, molecular plant biology and ecology). The panel hopes this will rapidly change as this RC is becoming more established. The identity of this RC (among staff and students) can become more evident with the establishment of graduate school programs (but also including local hands-on courses in "simple" bio-informatics) in Genome Technology, which the panel strongly supports. It would also be more appropriate to establish more common guidelines for doctoral training, recruitment etc. Many of the PIs are already involved in the ongoing graduate schools and that can be useful for the proposed graduate program.

There were 22 PhD theses (with 2-3 scientific publications each!) defended during 2005-2010 and approximately 200 papers have been published during this period. Furthermore, the number of citations per publication is high (14.73). Collectively it indicates that the RC provides high impact papers that can be viewed as a proxy for a strong doctoral training program.

The panel considers this RC as being a non-thematic driven and hence heterogeneous research community in contrast to the majority of the evaluated RCs. The thematic driven RCs have been scored according to their **joint thematic** impact in terms of research focus, doctoral training, societal impact and international activities. In contrast, this RC with a network of PIs is clearly driven by a common technology denominator, i.e. massive parallel sequencing. The panel acknowledges and supports the major need for such technology and accompanying applied bioinformatics but it had major problems with setting a joint score for such large heterogeneity, particularly with regard to the scientific "focus" in particular, notwithstanding the quality in doctoral training, societal impact and international networking. Actually the PIs demonstrate excellent examples of individual research activities.

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

The area of genomics has demonstrated to play an ever-increasing role in our society, especially with the affordable whole genome sequencing projects. The spectrum of topics represented in the RC is also used in outreach activities both in the private and public sectors.

For example the RC has impressive and important links to the private sector and collaborates with the forest, food and dairy and diagnostic companies, but is also active in the area of genetic markers in plant breeding. Members are also frequently involved as specialists towards the Ministry and in public media (radio, TV, web) and have equally frequently been involved in reviewing tasks (journals, positions and grants). This clearly is an asset but at the same time risks to divert the prime attention that should be given to constant building and maintenance of the technology platforms and, as importantly, the bio-informatics.

PhDs within the RC have also been involved as experts in IPR cases.

It is not clear from the material if a website has been established that could unify current and future developments in this RC in particular genome technology. This could include a lot of information on ongoing projects and also outreach activities.

The panel considers this RC as being a non-thematic driven research community in contrast to nearly all other evaluated RCs. The thematic-driven RCs have been scored according to their **joint thematic** impact in terms of doctoral training, societal impact and international activities. In contrast, this RC with a network of PIs is clearly driven by a common technology denominator only, i.e. massive parallel sequencing. The panel acknowledges and supports the major need for such technology and accompanying applied bioinformatics, but has found it difficult to set a joint score for such large heterogeneity in the proposed science.

Numeric evaluation: 4 (Excellent)

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

Description of

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

ASPECTS: Scientific quality, national and international collaboration

The RC has broad international and national networks demonstrated by for example very frequent coauthorship with external research groups and successful international funding at various levels (IPs, ERC grants, Marie-Curie ITNs - all EU). This is also evident since the majority of post-docs are not from Finland. The fraction of foreign PhD students is, as expected, much less (25%).

At national level many of the individual PIs are involved in various infrastructures (BI-DNAGEN, Genome wide technology and bioinformatics networks) and will hereby have an important role in various research collaborations, whilst preserving the leading national position of the Viikki-based genomics platforms.

It is quite difficult from the panel's perspective to fully understand the magnitude and the interaction of these infrastructures/networks, nationwide, and their relationship to the current RC. Again, this is a rather new RC and it will require more time to settle, but from the panel's impression there are many different fragmented efforts that risk to overlap significantly. The scientific community would benefit to have all these efforts within an umbrella organization within the university. An umbrella genome/bioinformatics technology organization with a critical mass could also propel the interaction with other international groups and EU consortia, and give higher visibility.

Numeric evaluation: 4 (Excellent)

2.5 Operational conditions

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

ASPECTS: Processes and good practices related to leadership and management

The RC contains several important infrastructures (DNA sequencing and genomics unit, Genome Biology unit) that are required in today's research. These appear to be widely used, including over a wide variety of fields and organisms, and new investments have been secured so that the infrastructures have in principle the capacity to evolve in line with the developments worldwide.

Future investments could go into more instruments and increasing staff, including bio-informaticians, to run the experiments. Of course, many of the array technologies will be replaced by massive parallel sequencing (MPS) in the near future. This would increase the demand for the MPS unit quite significantly; this is already currently happening in the transcriptome field.

As stated numerous times above, investments need also to be coupled increased efforts in bioinformatics. This is a difficult task supporting both new users as well as more advanced research, as mentioned above.

A key aim for a large university as the UH would be to organize these efforts to minimize fragmentation. Applied bio-informatics will be an additional unifying theme among different life science projects and it will be fundamental to serve and progress science.

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

It is clearly stated that this RC is an academic network where the different PIs come from various organizational units and all have individual academic goals. As explained in the document, there is no leader for the RC.

Instead, different forums are used for scientific interactions and one of the key units is the Genome Biology program. Some collaboration projects are ongoing, such as Glanville butterfly, Betula genome sequencing. Another forum is the Genetics and Genomics Research program.

As indicated, the PIs have excellent track record and collaborations are formed in line with their goals, and the management is pragmatically decentralized.

The network interactions can be a successful way forward for the individual groups, despite their sometimes strikingly different research interests, and it is clear that genomics competence is spread in these groups. However, there is definite room for a more concerted action in the genomics field. We note that a large number of different networks, centers, core units and graduate programs have been established around genomics. This is not a surprise given the broad application field of these tools but there may be an opportunity here to collect expertise in a more organizational manner with an increasing

critical mass that would benefit the RC and the scientific community. In such context, a leader for this RC with a management and doctoral training plan would be needed as well as funding support from the university, to establish a more ambitious genomics core that include computational resources and applied bioinformatics staff, that can provide both 'best practice' pipelines and collaborate in projects.

2.7 External competitive funding of the RC

• The RCs were asked to provide information of such external competitive funding, where:

the funding decisions have been made during 1.1.2005–31.12.2010, and

the administrator of the funding is/has been the University of Helsinki

• On the e-form the RCs were asked to provide:

1) The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation, EU, ERC, foundations, other national funding organisations, other international funding organizations), and

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

Competitive funding reported in the text is also to be considered when evaluating this point. ASPECTS: Scientific quality, scientific significance, societal impact, innovativeness and future significance

This RC is very well funded, inevitably from a multitude of sources. The seven PIs have funding from Finnish sources of almost 15 MEUR during 2005-2010 and almost 5 MEUR from EU and 0.5 MEUR from the US based National Science Foundation (NSF). This is on average 3.3 MEUR per year.

The Finnish funders comprise of the Academy of Finland and the Finnish Funding Agency for Technology and Innovation (Tekes), the latter being a sign of the industrial aspects of the RC as well. Funding from the EU is also significant and has the opportunity to create large networks that benefit internationalization for the participants and the scientific projects. A minor portion of funding is also obtained from the US but demonstrates the competitiveness of the RC.

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 action plan outlines some important aspects in the light of the transition from traditional disciplines to genome biology. Strategic recruitments have been identified, such as Thomas Sandmann (May 2011?), to fill important competence gaps of the local genome community. Another important topic is the relationship to other omics efforts on-campus. Here it would be desirable to have a more comprehensive outlook on how these could interact in a still more organized manner. Are there any projects that are using more than a single omics method (genomics, proteomics, metabolomics) and are there any plans how to integrate the data analysis? In addition, how is the infrastructure being coupled to projects that aim at genome-wide ChIP of transcription factor (complexes)?

Another issue is to keep pace with the method development and it is clear that the MPS infrastructure is excellent with new funding arriving for new instruments. The panel believes it will be even more important to coordinate the efforts with other large MPS genomics lab in order to be competitive at an international level including commercial providers. The panel is very positive about the interaction with the Institute for Molecular Medicine Finland (FIMM) in order to increase the capacity and access to these technologies.

Obviously price and access will be important but additional bio-informatics competences in a core unit - as stated above - will be critical for the broader research community. It is not entirely clear if the RC has such ambitions to include such activities, or if the RC will be a user of such, as no clear plans have been presented about this issue.

The plan to develop the education related to genome biology is another important measure and it is essential to communicate the new possibilities to a next generation of students. We strongly support any measures along these lines. The role of the RC in this perspective is more diffuse and may be dealt with in a more overall action plan at the Viikki campus.

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 4. The research of the participating community represents an innovative opening.

The RC is participating under category 4 ('The research of the participating community represents an innovative opening') and this seems appropriate and mentions also its link to the key focus area 2, The Basic Structure of Life, of the UH. The members have demonstrated excellent research merits and combined in this RC they represent different parts of genome technology in relation to their specific often (micorbial, plant, animal) species-driven research topic. There are clearly even more competences at the Viikki campus that could be included in the RC, to further fill up the themes within genome technology.

This RC is a new constellation and there is a potential for expansion of this RC in many different directions as outlined, such as the Graduate programs in Genome Technology, the expansion of infrastructure capabilities in instruments but also applied bio-informatics and the collaboration with other infrastructures in the area of omics. This direction may lead to propel the research to the scientific goals even more quickly.

Numeric evaluation: 1 (Sufficient)

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

All PIs contributed to the assembly of 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 RC activities are in line with the outlined focus areas of the UH.

2.12 RC-specific main recommendations

Recommendations depend on the future strategy for the RC, i.e. will it use a network model in the field of genome technology or will the RC take the lead for assembly of genome technologies into a more concerted action with even stronger infrastructure capabilities that for example (must) include a core applied bioinformatics unit, including a strategy for computer storage and data handling? The second alternative would need much more of planning in terms of management, organization and doctoral training, but likely one has to decide and act soon. The network model will be based much more on the initiative within the specific fields of the PI, and it can be expanded along the current paths with truly thematically joint and at the same time technology-driven projects.

Genome biology will most likely have an increasing role in the research at the Viikki campus including ecology, and a graduate program in this field should be prioritized.

2.13 RC-specific conclusions

The group members of this RC work in a broad array of fields ranging from bacteria over plants to animals and they share an impressive track record in their particular field. The common denominator of the Pls is the use of the emerging genomic massive parallel sequencing toolbox, and the panel judges that a common technology does not fulfill the criteria as thematic driven researcher community, RC. Yet the panel finds the efforts in massive parallel sequencing and related applied bioinformatics of key importance not only for this RC but also for the entire Viikki campus, demonstrated by many other research communities.

The panel strongly suggests that the University of Helsinki increases its ambitions to establish a more extensive genomic infrastructure to address the increasing need throughout the campus. This will secure that research will be at the international edge and to avoid fragmentation of a core technology. Such infrastructure should include additional investments in instruments but also an increased ambition in applied bioinformatics that includes hiring of permanent staff that could work in collaborative fashion in the projects (such as those within the RC) for defined periods of time. Recruitment of key competences in analysis of de novo genomes, re-sequencing, transcriptome, ChIP-sequencing etc appears to be needed, and could hereby foster a new generation of researchers and overall improve communication between different disciplines based on common knowledge to handle and interpret high-throughput data. A research school within such genome technology infrastructure could also be considered but would require some more planning as this will represent a new type of non-thematic research school.

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: Viikki Genome Biology Research Community (ViiGen)

LEADER OF THE RESEARCHER COMMUNITY: Professor Yrjö Helariutta, Department of Biosciences, Institute of Biotechnology, Faculty of Biological and Environmental Sciences

RC-SPECIFIC MATERIAL FOR THE PEER REVIEW:

- Material submitted by the RC at stages 1 and 2 of the evaluation
 - STAGE 1 material: RC's registration form (incl. list of RC participants in an excel table)
 - STAGE 2 material: RC's answers to evaluation questions
- TUHAT compilations of the RC members' publications 1.1.2005-31.12.2010
- TUHAT compilations of the RC members' other scientific activities 1.1.2005-31.12.2010
- Web of Science(WoS)-based bibliometrics of the RC's publications data 1.1.2005-31.12.2010 (analysis carried out by CWTS, Leiden University)

NBI 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)



RC-SPECIFIC STAGE 1 MATERIAL (registration form)

1 Responsible person

Name: Helariutta, Yrjö E-mail: Phone: +358-9-19159422 Affiliation: Institute of Biotechnology Street address: P.O.Box 65 (Viikinkaari 1)

2 DESCRIPTION OF THE PARTICIPATING RESEARCHER COMMUNITY (RC)

Name of the participating RC (max. 30 characters): Viikki Genome Biology Research Community

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

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): During the last decade, our understanding of the genome has undergone paradigmatic change. The complete genome sequences for humans and most model organisms are now available. Furthermore, recent, massively parallel DNA sequencing enables the rapid de novo sequencing of completely new genomes or the re-sequencing of genomes or transcriptomes of of selected individuals, mutants or populations. Combined with various other experimental approaches, these new technologies provide a global view on genome function and dynamics, from sequence variation (SNPs, insertions and deletions, transposon integration, rearrangements), transcription, RNA processing and editing, and regulation by small RNAs to epigenetic patterns of DNA and chromatin modification.

These advances have created a strong momentum for forming a genome biology research community in order to best apply the new genomic data to research questions ranging from molecules to populations. The Viikki campus accommodates several bioscience faculties and institutes, which are studying both model and non-model organisms. Importantly, many units and research groups are already pursuing genomic analyses using new sequencing and ancillary technologies. Similarly, the DNA Sequencing and Genomics Laboratory at the Institute of Biotechnology has been the pioneer in Finland implementing new sequencing technologies. To provide further coherence to these research endeavors on the Viikki campus by bridging the various methodological and conceptual approaches, we have recently initiated a new research community on Genome Biology.

In addition to advancing local genomics research, the Community also aims to provide a broad education to young researchers in this emerging discipline. The research community already organizes several lecture and practical courses, and it has its own seminar series (Genome Club). It unites the activities of several graduate schools including those in molecular biology (VGSB, GPBM), medicine (HBGS), computational science (FICS), and ecology (LUOVA).



RC-SPECIFIC STAGE 1 MATERIAL (registration form)

3 SCIENTIFIC FIELDS OF THE RC

Main scientific field of the RC's research: biological, agricultural and veterinary sciences

RC's scientific subfield 1: Genetics and Heredity

RC's scientific subfield 2: Biochemistry and Molecular Biology

RC's scientific subfield 3: Mathematical and Computational Biology

RC's scientific subfield 4: Ecology

Other, if not in the list: Bioinformatics and genomics

4 RC'S PARTICIPATION CATEGORY

Participation category: 4. Research of the participating community represents an innovative opening

Justification for the selected participation category (MAX. 2200 characters with spaces): As indicated above, the Research Community is very new and builds on novel technological openings in genome-wide biology. Much of the Community officially came together only during 2010, although the individual members of the Community have had a remarkable scientific record in underlying fields and have independently initiated investigations on the genome scale. Therefore, we feel that the most appropriate category is 4.

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): RC:

- Ykä Helariutta approaches plant development based on Arabidopsis genetics. Together with other researchers at Viikki he participates to the birch (Betula pendula) and Populus genome research.

- Petri Auvinen uses novel DNA sequencing techniques and bioinformatics in several de novo genome projects ranging from microbes to eukaryotes. The unit is also studying microbe communities using metagenomic approach.

- Mikko Frilander conducts research primarily on pre-mRNA splicing, specializing on the parallel U12dependent spliceosome with a variety of approaches including genomics. Additionally, he has applied ecological genomics on Glanville (together with Ilkka Hanski, below) and Daphnia magna (EEFG consortium).

- Ilkka Hanski has directed a large-scale project on metapopulation biology of the Glanville fritillary butterfly for 20 years. In the past few years he has initiated genomic research

on the genetic basis of life-history traits and population dynamics.

- Liisa Holm's main interests are protein sequence-structure-function relationships and interaction networks. She is involved in genome annotation in a number of projects on campus.

- Tomi Mäkelä is characterizing signaling pathways regulating mammalian cell growth. His major focus is transcriptional regulation by cyclin-dependent kinases Cdk7 and Cdk8 with approaches, such as mouse



RC-SPECIFIC STAGE 1 MATERIAL (registration form)

molecular genetics, Drosophila knockdown strategies, cell-based and protein interaction screening approaches.

- Alan Schulman concentrates on the role of retrotransposons in genome dynamics and epigenetic, and exploits the sequenced model genomes for map-based cloning of cereal genes. He is a member of the steering committee of the International Barley Genome Sequencing Consortium, and currently as a co-PI in the JGI genome project for barley.

Selected publications:
Tuskan G. et al. Science 313,1596-604.
Vera JC et al. Molecular Ecology 17, 1636-1647.
Verbeeren J et al. Mol Cell 37, 821-833
Vogel JP et al. Nature. 463, 763-768.
Kankainen M. et al. Proc. Natl. Acad. Sci. U.S.A., 106,17193-17198.
Holm L et al. Bioinformatics 24, 2780-2781.
Wu J et al. Nat Methods. 6, 75-7.

- Ph.D theses 2005-2010: 22

Significance of the RC's research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): The RC will provide a timely collaborative forum to integrate and implement the new technologies as well as bioinformatics and experimental approaches. Based on this integration, a cross-talk between theoretical and experimental approaches can properly be formulated. The RC also enhances integration of the genome analysis core units of the Institute of Biotechnology together with relevant groups in the Viikki campus. The Community is also at a strategic position to coordinate the acquisition and utilization of infrastructures, such as the various sequencing and array technologies, as well as the bio-computing software and hardware within the campus. Finally, formalizing the joint activities in this area on the Viikki campus within the RC will enhance opportunities to interact and take the initiative in collaborative projects nationally and internationally.

The following technological platforms are part of the RC:

- The DNA sequencing and genomics unit is serving scientists for DNA sequencing and library handling. The unit performs DNA sequencing from single clones (ca. 15000 samples 2009) to large de novo genome projects. It has sequenced hundreds of samples during the last few years utilizing Next Generation sequencing (NGS) platforms. The unit is part of the Genome-wide Methods Biocenter Finland platform and Bioinformatics network of Biocenter Finland.

- Genome Biology Unit (GBU; http://www.biocenter.helsinki.fi/bi/gbu) headed by Rafael Martinez together with Tomi Mäkelä provides a technology platform for services and reagent collections related to genome-wide approaches nationally as part of the Genome-wide Methods Biocenter Finland



RC-SPECIFIC STAGE 1 MATERIAL (registration form)

platform. Services include collection, generation, and distribution of large knockdown (both shRNA and siRNA based) and open reading frame (ORF) reagent sets in mammalian and fly systems. In addition unit provides integrated ORF cloning services and yeast two-hybrid screening.

- Bioinformatics approaches for gene expression analysis, contig and genome assembly, and physical map assembly and prediction. SNP analysis, variome, annotation

Fingerprinting and SNP detection methods for genome dynamics analyses

Keywords: functional genomics, bioinformatics, ecological genomics, metagenomics, plant genomics

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): Based on their published work, the individual researchers within the RC are internationally on the leading edge. However, the RC has yet to show its excellence as a unit due to relative young age of the field. At the national level the RC includes leading experts on genome biology and the individual PIs have been active in educating scientists (both students and more advanced researchers) in the field.

RC has and will be active in promoting new developments in available infrastructure including genomewide/high throughput methods. In addition to high impact research using models such as mouse, Drosophila, Hordeum, Arabidopsis and Brachypodium, the RC has been able to, or is about to, establish internationally recognized new models for molecular biological work such as Melitae cinxia and Betula pendula. Large amounts of genomic information (EST and whole genome sequences) have been and are being produced for these species. The excellence has been recognized as the members belong to four Academy of Finland Centers of Excellence (CoE in Plant Molecular Biology and Forest Biotechnology (2000-2005)/CoE in Plant Signal Research (2006-2011), CoE in metapopulation biology (2000-2005; 2006-2011) and CoE in Translational Genome-Scale Biology (2006-2011). Helariutta and Holm have received EMBO Membership. Hanski has received European Latsis Prize 2010 for biodiversity; Foreign associate of the National Academy of Sciences (US, 2010), Finnish Science Award (2007) and Foreign Member of the Royal Society (2005). External funding has been significant with a total of € 16 million EUR during the evaluation period. During 2005-2010, the members of RC have published altogether 207 scientifically refereed publications. They have been often published in forums with a high visibility, such as Nature, Science, PNAS, PLoS Biology, Genome research, Molecular cell, Nature cell biology, Nature Methods and Bioinformatics, emphasizing the high quality of research within the RC. Doctoral training within the RC has been organized through four main graduate schools focusing on molecular biosciences (VGSB, GPBM), molecular plant biology (FGSPB), and ecology (Luova).

Comments on how the RC's scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces): As the results of the RC are published in the periodic journals, often of high general visibility, the scientific productivity and doctoral training can be assessed based on the published articles, the impact factor of the corresponding journals and citation information.
LIST OF RC MEMBERS

NAM	E OF THE RESEARCHER	COMMUNITY:	Viikki Genome Biology Research Co	mmunity
RC-LE	EADER		Y. Helariutta	-
CATE	GORY		4	
			Title of research and	
	Last name	First name	teaching personnel	Affiliation
1	Schulman	Alan	Professor	Institute of Biotechnology
2	Kalendar	Ruslan	Senior Researcher	Institute of Biotechnology
3	Moisy	Cedric	Postdoctoral Researcher	Institute of Biotechnology
4	Jääskeläinen	Marko	Doctoral Candidate	Institute of Biotechnology
5	Chang	Wei	Doctoral Candidate	Institute of Biotechnology
6	Jaakko	Tanskanen	Doctoral Candidate	Institute of Biotechnology
7	Holm	Liisa	Professor	Institute of Biotechnology and Faculty of Biosciences, Dept of genetics
8	Törönen	Petri	Postdoctoral Researcher	Institute of Biotechnology
9	Kankainen	Matti	Doctoral Candidate	Institute of Biotechnology
10	Helariutta	Yrjö	Professor	Institute of Biotechnology and Faculty of Biological and Environmental Sciences, Dept of Biosceinces
11	Bishopp	Anthony	Postdoctoral Researcher	Institute of Biotechnology
12	Dettmer	Jan	Postdoctoral Researcher	Institute of Biotechnology
13	Elo	Annakaisa	Postdoctoral Researcher	Institute of Biotechnology
14	Ruzicka	Kamil	Postdoctoral Researcher	Institute of Biotechnology
15	Miyashima	Shunske	Postdoctoral Researcher	Institute of Biotechnology
16	Zhang	Jina	Postdoctoral Researcher	Institute of Biotechnology
17	Yaday	Shri Ram	Postdoctoral Researcher	Institute of Biotechnology
18	Vaten	Anne	Doctoral Candidate	Institute of Biotechnology
10	Immanon	luha	Doctoral Candidate	Institute of Biotechnology
19			Doctoral Candidate	
20	Heip El Sabawk	Hanna	Doctoral Candidate	Institute of Biotechnology
21		Seeder		
22	Lichtenberger	капаеі	Doctoral Candidate	
23	Ursache	Robertas	Doctoral Candidate	Faculty of Biological and Environmental Sciences, Dept of Biosceinces
24	Frilander	Mikko	University Reseacher	Institute of Biotechnology
25	Meng	Xiaojuan	Postdoctoral researcher	Institute of Biotechnology
26	Pessa	Heli	Doctoral candidate	Institute of Biotechnology
27	Turunen	Janne	Doctoral candidate	Institute of Biotechnology
28	Niemelä	Elina	Doctoral candidate	Institute of Biotechnology
29	Verbeeren	Jens	Doctoral candidate	Institute of Biotechnology
30	Kvist	jouni	Doctoral candidate	Institute of Biotechnology, Faculty of Biosciences Dept of biological and environmental sciences
31	Auvinen	Petri	University Reseacher	Institute of Biotechnology
32	Paulin	Lars	University Instructor	Institute of Biotechnology
33	Koskinen	Kaisa	Doctoral Candidate	Institute of Biotechnology
34	Ritari	Jarmo	Doctoral Candidate	Institute of Biotechnology
35	Pitkäranta	Miia	Doctoral Candidate	Institute of Biotechnology
36	Laine	Pia	Doctoral Candidate	Institute of Biotechnoloav
37	Alatalo	Edward	Doctoral Candidate	Institute of Biotechnology
38	Greco	Dario	Postdoctoral Researcher	Institute of Biotechnology
20	Hultman	lenni	Postdoctoral Researcher	Institute of Biotechnology
10	Gunta	Rashi	Postdoctoral Researcher	Institute of Biotechnology
40	Mäkolä	Tomi	Professor	
41				Faculty of Biological and Environmental
42	Hanski	llkka	Professor	Sciences, Dept of Biosciences



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BACKGROUND INFORMATION

Name of the RC's responsible person: Helariutta, Yrjö

E-mail of the RC's responsible person:

Name and acronym of the participating RC: Viikki Genome Biology Research Community, ViiGen

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: Our understanding of the genome has recently undergone paradigmatic change. Massively parallel DNA sequencing enables the rapid de novo sequencing of completely new genomes or the re-sequencing of genomes or transcriptomes of selected individuals, mutants or populations. Combined with various other experimental approaches, these new technologies provide a global view of genome function and dynamics related to research questions ranging from molecules to populations. The Viikki campus accommodates several bioscience faculties and institutes. Many research units are already pursuing genome analyses. Similarly, the DNA Sequencing and Genomics Laboratory (Institute of Biotechnology) has been the Finnish pioneer in implementing new sequencing technologies. To provide further coherence to these research endeavors on the Viikki campus at the methodological and conceptual levels, we have recently initiated a new Research Community (RC) on Genome Biology, which connects various genome-wide operations at the Viikki campus, both at the Institute of Biotechnology and several departments.

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).

RC's research focus:

The RC focuses on understanding genome function and dynamics as relevant to growth, development, stress response in individuals as well as evolution of populations through the application of massively parallel technologies for DNA and RNA sequencing and hybridization (arrays) and concomitant bioinformatics. The RC encompasses the full spectrum of genomic biology investigations including genome structure and function, gene expression, microbial genomics, eukaryote genomics, bioinformatics, metagenomics, and ecological and population-level genomics.

During 2005-2010 the individual members (listed below) of the RC displayed a remarkable scientific record in underlying biological fields and, importantly, each has independently initiated various genomescale biological investigations. On 2010 this development has led to the launch of a campus-wide network (Viikki Genetics and Genomics Research Network) and at the Institute of Biotechnology to the launch of the Genome Biology Research Program.

- Ykä Helariutta (YH; Research Director/Institute of Biotechnology and Professor/Department of Biosciences) approaches plant development based on Arabidopsis genetics, and birch (Betula pendula) and Populus genome research.

- Petri Auvinen (PA; Laboratory Director /Institute of Biotechnology) uses novel DNA sequencing techniques and bioinformatics in several de novo genome projects ranging from microbes to eukaryotes. The unit is also studying microbe communities using a metagenomic approach.



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- Mikko Frilander (MF; Group Leader/Institute of Biotechnology) conducts research primarily on premRNA splicing, specializing on the parallel U12-dependent spliceosome with a variety of approaches including RNAseq using various deep sequencing platforms. Additionally, he has applied ecological genomics on Glanville fritillary and Daphnia magna (european-wide EEFG consortium).

- Ilkka Hanski (IH; Academy Professor/Department of Biosciences) has directed a large-scale project on metapopulation biology of the Glanville fritillary butterfly for 20 years. He initiated a genomic project on the Glanville fritillary in 2005 in collaboration with Prof. J. Marden (Penn State) with a grant from NSF (US). Subsequently the project has greatly expanded within the present RC in Helsinki (see below).- Liisa Holm's (LH; Professor/Department of Biosciences/Institute of Biotechnology) main interests are protein sequence-structure-function relationships and interaction networks. She is involved in genome annotation in a number of projects on campus.

- Tomi Mäkelä (TM; Director/Institute of Biotechnology) is characterizing signaling pathways regulating mammalian cell growth. His major focus is transcriptional regulation by cyclin-dependent kinases Cdk7 and Cdk8 with approaches, such as mouse molecular genetics, Drosophila knockdown strategies, cell-based and protein interaction screening approaches.

- Alan Schulman (AS; Director, Genomics Research and Professor/Agrifood Research Finland and Group Leader/Institute of Biotechnology) concentrates on the role of retrotransposons in genome dynamics and epigenetic, and exploits the sequenced model genomes for map-based cloning of cereal genes. He is a member of the steering committee of the International Barley Genome Sequencing Consortium, and currently as a co-PI in the JGI genome sequencing project for barley.

There are several joint research projects within the RC:

- Betula pendula genome project (partners YH, PA, LH, Jaakko Kangasjärvi/[Dept of Biological Sciences). In this project various adaptive traits related to tree life form are pursued with the emphasis on wood development in this tree species with a rapid life cycle (one year generation time). Currently progenies from various genetic crosses (both self- and cross-fertilization) are being analyzed and the genome sequencing project is being initiated using the same technological platform as the Glanville genome (see next).

- Glanville fritillary genome project (partners IH, MF, PA, LH). We have initiated a large-scale project on the ecological genomics of the Glanville fritillary butterfly, which is a well-established ecological model system. We sequenced the transcriptome four years ago and are currently sequencing the full genome. The general aim of this research is to discover the genetic basis of phenotypic variation, life history traits, and population dynamic parameters in natural populations living in a heterogeneous environment. The entire ~320 Mb genome is being sequenced, primarily at the Viikki campus and annotated in collaboration with European Bioinformatics Institute (EBI). The fully sequenced genome will serve as a backbone in designing various population biology and genetic investigations examining both allelic variation and gene expression in natural populations.

- Barley genome sequencing project (partners AS, PA). The international effort aims to produce a highquality draft of the large (5.5 Gb) barley genome. Here, we are developing mate-pair reads of lengths up to 20 kb in order to aid the assembly of sequenced contigs into scaffolds.

- Identification and characterization of gene functions related to vascular development in Arabidopsis (partners YH, MF, PA, LH, AS). Through various mutant screens YH's laboratory has recently identified



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several mutants. The loci of several other mutants are being mapped by resequencing of the mutated genome, followed by characterization.

The quality of the RC's research:

The excellence of the individual members has been recognized both nationally and internationally recognized as the members belong to four Academy of Finland Centers of Excellence (CoE in Plant Molecular Biology and Forest Biotechnology (2000-2005), CoE in Plant Signal Research (2006-2011), CoE in metapopulation biology (2000-2005; 2006-2011) and CoE in Translational Genome-Scale Biology (2006-2011). YH and LH are recipients of EMBO Membership. IH has received Crafoord Prize (2011) and European Latsis Prize 2010 for biodiversity. He is a foreign associate of the National Academy of Sciences (US, 2010) and a Foreign Member of the Royal Society (2005).

A list of selected publications from individual groups with joint publications within the RC labeled with asterisks is shown below: Tuskan G. et al. Science 313,1596-604. *Vera JC et al. Molecular Ecology 17, 1636-1647. Verbeeren J et al. Mol Cell 37, 821-833 Vogel JP et al. Nature. 463, 763-768. *Kankainen M. et al. Proc. Natl. Acad. Sci. U.S.A., 106,17193-17198. Holm L et al. Bioinformatics 24, 2780-2781. Wu J et al. Nat Methods. 6, 75-7.

The scientific significance of the RC:

The paradigmatic change brought by genome-wide biology has significantly affected both the traditional molecular biology and biomedical research for model organisms and a large number of other disciplines investigating less well characterized organisms with ecological, microbiological, and agricultural relevance. The new sequencing methods and tools (RNAseq, epigenomics, SNP biomarkers, metagenomics) allow more precision at the genomic level for non-model organisms. As an example IH and MF recently collaborated on a widely recognized pioneer study, the transcriptome characterization of the Glanville fritillary (Vera JC et al. see above). A similar pioneering collaboration project to sequence the entire genome of the Glanville fritillary is currently underway (by IH, PA, MF and LH) and a similar genome-sequencing effort is underway for barley and planned for birch. In this respect, the RC is an international pioneer in promoting cross-disciplinary research.

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

During 2010 the RC has already made significant progress in further integration. For dissemination we have initiated a regular campus-wide meeting series, Genome Club. The Institute of Biotechnology has initiated the Genome Biology Research Program. The developing synergy within RC was further exemplified by a successful 1.4 M€ infrastructure funding to IH and PA and granted by the Academy of Finland, which provides an upgrade to the current sequencing and genotyping capacity with an Illumina HiScan instrument and a single-molecule DNA sequencer. This makes Viikki the largest NGS sequencing center in Finland and allows the RC to address genome-wide questions in model and non-model species. Furthermore, we are developing a common strategy for bioinformatics related to genome biological research on-campus. These initiatives will lead to integrated and mutually supportive application of the RC technology platforms for discovery of shared underlying principles in genome biology.



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

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

The doctoral candidates are selected and recruited by the PIs, typically based on interaction during undergraduate education, special courses and seminar series, where the RC plays a major role. International collaborations and networks such as the Marie Curie ITN program also provide a route to attract qualified and talented doctoral candidates. Even though formal calls for individual research groups are advertised in internet forums such as FinBioNet and EUROPA Research Mobility Portal (international calls), most of the students are often attracted to research groups by directly contacting the PIs. In all cases earlier a student's track record and motivation are the main factors.

The supervision occurs through constant interaction within the research groups. The relatively high proportion of postdoctoral fellows in the RC facilitates supervision at the technical level. The RC, through its shared platforms, provides technical training and laboratory competence in the methods necessary for the execution of the candidates' experiments. This includes design and documentation of experiments and critical interpretation of results, augmented through discussions with other RC members.

Graduate schools

The PhD students are generally affiliated with one of the several graduate schools operating at the Viikki campus, either as full members or as matching-funds students. The graduate schools offer multidisciplinary education in the form of practical courses and lecture series, which equip individual student with general skills in pursuing their PhDs. The specialized skills needed for completion of a PhD and the necessary 2-3 scientific publications are provided by the individual research groups, who are also responsible for day-to-day training of the students. Practically all the students have follow-up groups consisting two external PI-level members who provide additional advice, support, and feedback during the doctoral projects. Together the combination of formal doctoral studies, work in the research group and the follow-up groups provide the student excellent in finishing the PhD. Given the new status of RC, there is not yet a formal genomics major to be offered to the students. Instead, the individual courses related to genomics are provided within the many graduate schools. Combining a comprehensive genomics program will be one of the most important tasks for the new RC.

Doctoral training within the RC has been organized through six main graduate schools focusing on molecular biosciences (VGSB, GPBM), medicine (HBGS), computational science (FICS), molecular plant biology (FGSPB), and ecology (Luova).

The RC holds the strategic role for training genome biology through these schools.

 As the professor at the Department of Biology YH gives lectures on undergraduate teaching. As a board member for the VGSB he organizes courses on Plant Genomics typically in collaboration with other researchers and graduate schools.



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- As a laboratory director PA has been actively giving lectures for undergraduates and graduate students as well as high school students. He has been organizing courses for DNA microarrays, bioinformatics, microbiology and next-generation genomics.
- MF has actively participated in undergraduate graduate teaching, concentrating on gene expression and its regulation. His main teaching contribution is a lecture series "pre-mRNA processing in eukaryotes" consisting on 12 lectures on pre-mRNA processing. Additionally, MF participates in teaching in various lecture series both at the University of Helsinki and other Finnish universities. He also serves as a vice-member of the VGSB board.
- IH directs the LUOVA graduate school at the Department of Biosciences. Although this graduate school is primarily concerned with ecology and evolutionary biology, it has organized several courses related to ecological genomics in recent years. These courses include the following: An Introduction to Evolutionary and Ecological Genomics, Use of Animal Models in Quantitative Genetics, Bayesian Analysis for Life Sciences, Quantitative Ecological Genetics, and Conservation Genetics.
- As the professor of bioinformatics LH is in charge of teaching in this increasingly important topic in the campus. She is also a member of the VGSB board.
- AS is a member of the board of the FGSPB and participates in organizing courses therein as well as giving lectures on genome dynamics and evolution.
- TM is central person in research training: Chairman of the Board, Helsinki Biomedical Graduate School (HBGS) 2007-: Director, Helsinki Biomedical Graduate School (HBGS) 2002-2007: Member of the steering committee for The Master's Degree Program in Translational Medicine, Faculty of Medicine (2008-2013); Board member of the Faculty of Medicine M.D., Ph.D. graduate program 1996->2007

The members of the RC has also jointly organized several courses. As a starting research community the RC organized in early 2010 a highly popular "Next Generation Genomics" lecture and lab course (organized jointly by PA, LH, MF, TM and YH), which attracted an exceptionally wide spectrum of students across the campus.

Other examples from the courses:

- DNA-microarrays-practical course (PA,3 credits) Institute of Biotechnology, University of Helsinki, Helsinki graduate school in biotechnology and molecular biology.

- High-throughput bioinformatics, (PA 5/7 credits) (T-61.5050). Jointly with Dr. Samuel Kaski (Helsinki University of Technology).

- High-throughput sequencing (PA 2 cr).

Quality control in doctoral training

Ultimately the quality of the doctoral training is the responsibility of the host research group. In practice the graduate schools and the research groups collaborate in this task. For example good practices have been documented in Viikki Graduate School of Molecular Biosciences Code of Conduct: http://www.biocenter.helsinki.fi/viikkigs/code_conduct.pdf. It details practices including the personal study plan, annual monitoring, troubleshooting, and responsibilities of the supervisors, the PhD student, and the graduate schools. These guidelines are supplemented by various ethical courses, and are also discussed during the practical laboratory courses. The minimal requirements for PhD theses are largely set at the departmental level and the RC groups follow these guidelines. However, the individual research groups do have major impact on the contents of PhD theses. The Graduate Schools require follow-up groups (advisory committees) for its students, and the RC provides the ideal source of committee members. The home faculty departments of the candidates provide a formal structure for completion and evaluation of the work of the candidates. Additionally, the students will get feedback in



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various research seminars, ranging from internal group meetings, Genome Club, departmental seminars, and various retreats, in which they have an opportunity to present their own data to their peers.

Assuring good career perspectives after doctoral training

The key for good career perspectives is training in transferrable skills. The ViiGen RC provides, because of its use of generic approaches, not only training in the host lab, but also in RC member labs where particular techniques and analyses can be learned. Such exchanges both foster collaboration and cohesion within the RC and provide the broad exposure that can help with placement into postdoctoral positions and beyond. The RC thereby provides a network of contacts for future placements and career development. Moreover, the seminar series within the RC gives training in the presentation and communications skills essential for life as a s

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

The interdisciplinary nature of the RC is both a strength as well as a challenge. The research of the RC partners, extending from molecules to populations, is unified by the common technology platforms and approaches yet is also depend on a broad array of methods in cell biology, physiology, genetics, and statistics. A broadly trained PhDs who nevertheless have deep expertise in a particular field will be better prepared to seize opportunities that represent outgrowths of his dissertation research. Nevertheless, in order to take advantage of the interdisciplinarity, the student will need to be pro-active in seeking advice and flexible in adapting new disciplines and approaches. It is the challenge of the RC to facilitate this process. Actions will therefore include the interdisciplinary Genome Club seminar series, retreats, and short-term laboratory placements within the program.

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).

Genome biology with its comprehensive nature has an increasing impact on society. The societal impact of the RC as a whole accrues from the specific expertise of each group.

Research:

- All the researchers pursue high quality basic research, a central element of society

- YH's research on wood formation is partly sponsored by the ForestCluster company (SHOK). As part of this organization it is steered by forest companies such as StoraEnso and UPM. The same partners will follow the birch genome project, which is a collaborative project with forest breeders of Metla. YH has also participated in public discussion on Genetically Modified Organisms.

- PA's research has many practical aspects stemming from the significant applicability and adaptability of the microarray and deep sequencing methods used and developed in his laboratory. This is reflected in a large number of collaborations between the academic and commercial partners. A large number of projects have been funded by TEKES (the Technology Agency of Finland), which demands several commercial partners in addition to academic participants. Examples include research projects focusing on food spoilage, identification of novel enzymes using NGS and diagnostic applications based on bioinformatics methods for identification of various microbes, and a genome sequencing collaboration with a dairy company (VALIO) concentrating on publicly widely used probiotic microbes. PA group has



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also collaborated extensively with research institutes (THL, MTT, VTT, METLA) under the umbrella of several different ministries and with several universities in Finland and abroad.

- IH is involved in a research project examining the relationships between environmental biodiversity, diversity of human endogenous microbiota (surveyed via metagenomics in collaboration with PA) and incidence of asthma, allergies and various inflammatory diseases.

- The research of AS has had its greatest societal impact in the development of rapidly deployed, inexpensive to use, molecular marker systems based on retrotransposons. The unit developed markers for timothy for the Boreal Plant Breeding, Ltd., which is the major commercial plant breeder of Finland. The work enabled them to save several years in the development of improved timothy varieties and get the benefits into the hands of local farmers in a timely manner. Internationally, they have hosted many researchers from third-world countries to develop molecular marker systems for important "orphan" crops. The marker work has led to positional cloning of a yellow rust resistance gene in wheat to forestall a major threat to worldwide wheat production. They also provide expert statements for the Ministries of Agriculture, Environment, and Health ranging from food safety to GMO release.

-TM acts as a specialist in cancer related issues recently in ministry of Social Affairs and Health; Duodecim journal 2002-2009 basic research science editor; multiple TV/radio/other media appearances, Patent (licensed): US 5955291-Antibodies recognizing tie receptor tyrosine kinase.

Doctoral training:

In addition to university placements, several PhDs trained in the RC have obtained expert positions outside academia. These people are typically employed as GMO or IPR experts.

• Ways to strengthen the societal impact of the RC's research and doctoral training. Information from the genome biological research will have an increasing impact in the society. On one hand this is because of the methodology. Various biomarkers will be increasingly used in applications as diverse as hygiene, breeding, and conservation biology. On the other hand, genome biology training stands out due to its multidisciplinary nature ranging from molecules to populations in the various kingdoms of life. Therefore, we are training a new generation of experts with exceptional skills to combine information at various levels. In this context, we are applying for, or participate in, ITN (Marie Curie) networks for doctoral training and for FP7 and 8 integrated projects. These involve collaboration and secondments in breeding and biotechnology firms and provide opportunities as well for career paths in government ministries.

4 International and National (Incl. intersectoral) research collaboration and researcher mobility (max. 4400 characters with spaces)

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

The RC is highly integrated nationally and internationally. It has published some 114 original articles with 445 international coauthors from 21 countries. It also collaborates with some 30 laboratories from Finland. Members of the community typically lead or participate to projects with an European funding status (EU, ERC, Eurohorcs, ERA-Net).



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The RC has international roles in major international sequencing projects, such as yeast genome, Populus and Brachypodium. AS is a principal investigator of the barley sequencing project (by JGI). It has also a major impact in bioinformatics; the Dali server web-site for protein structure database searching developed by LH is the among most accessed internet service sites in life sciences in Finland.

The Community is also at a strategic position to coordinate the acquisition and utilization of infrastructures, such as the various sequencing and array technologies, as well as the bio-computing software and hardware within the campus. The BI-DNAGEN unit (PA) is nationally in charge of de novo genome sequencing and metagenomics (first active in this area); The RC has also responsibilities in the Biocenter Finland initiative. TM is in charge of the Genome Wide Technologies Network, which has crucial responsibilities for Finnish infrastructure for services in this area. It also connects to the BBMRI-ESFRI. LH is in charge of the Bioinformatic network of the Biocenter Finland initiative.

AS has a joint research lab with Agrifood Research Finland (Ministry of Agriculture). He is an Expert Advisor at the Gene Technology Board (statements on GMO status); as well as at the National Advisory Board on food, agro, fisheries, biotech -thematic programs of EU FP7.

The RC also attracts international students, currently 5 of the 20 graduate students and 11 of the 14 post doctoral fellows are international, mostly European but including students from Asia.

The international post doctoral recruitments are typically from world-class research groups from top universities. Students and post docs trained by the RC typically obtain strong next position after leaving the RC. They have often been awarded by various thesis prizes as well as international grants, such as HFSP or EMBO. Several post doctoral fellows have obtained a professor or independent position elsewhere through their work in the RC, such as Annelie Carlsbecker (assistant professor, Uppsala University), Francois Sabot (CNRS, France), Damien Hermand (University of Namur) and Irvine Weissman (Harvard Medical School).

The RC has been involved in organizing joint doctoral training activities, such as Joint COST/FP7 training course on Applied Bioinformatics in Plant Science (Athens) and FinGer collaboration between Finland and Germany on plant biology and developmental biology.

Members of the RC has been also active in organizing various international meetings in Finland and abroad as members of the various boards.

Formalizing the joint activities in this area on the Viikki campus within the RC will enhance opportunities to interact and take the initiative in collaborative projects nationally and internationally.

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

Traditionally Finland had had two world-class fields in life sciences: molecular biology and biomedical research; and ecological and environmental sciences. These two disciplines have had earlier only a modest interaction. Now, following the advances in genomics, this division is rapidly dissolving and there are now several species that are being analyzed at transcriptome or genomic level as large collaborative efforts within the RC. This development exemplifies the strength of the RC to extend the definition of genomics to new horizons. A challenge is to attempt a further integration. Ecology has a long tradition in mathematical modeling of complex ecological systems and analysis of noisy data sets. It



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is possible that similar mathematical tools can be developed to analyze equally large and complex genome-level data sets.

In terms of international mobility, we have also close connections to the Science for life laboratory (SciLifeLab) in Stockholm and the Norwegian High-Throughput Sequencing Centre (NSC) as well as Joint Genome Institute (JGI, USA); IBIS/MIPS (Munich) and EBI.

5 OPERATIONAL CONDITIONS (MAX. 4400 CHARACTERS WITH SPACES)

Description of the operational conditions in the RC's research environment (e.g. research infrastructure, balance between research and teaching duties).
The RC has exceptionally good operating conditions at the Viikki Campus. The Institute of Biotechnology has several sophisticated technology platforms located at the core units that are all headed by the members of the RC. The most significant technology platform is located at the DNA sequencing and genomics unit. The unit has impressive instrumentation including next generation sequencers (454 Titanium and SOLiD 4), microarray scanners, qPCR instruments, liquid and colony handling robotics, a large bank PCR machines, and a significant computing cluster linked to an internal in-house ultra-high-speed network and to backup services. The unit offers DNA sequencing from single clones (ca. 15000 samples 2009) to large de novo genome projects. It has sequenced more than 2000 samples during 2010 with Next Generation sequencing (NGS) platforms and participated on many genome projects. The unit is part of the Genome-wide Methods Biocenter Finland platform and Bioinformatics network of Biocenter Finland.

The Genome Biology Unit (GBU; http://www.biocenter.helsinki.fi/bi/gbu) headed by Rafael Martinez together with TM provides a technology platform for services and reagent collections related to genome-wide approaches nationally as part of the Genome-wide Methods Biocenter Finland platform. Services include collection, generation, and distribution of large knockdown (both shRNA and siRNA based) and open reading frame (ORF) reagent sets in mammalian and fly systems. In addition, the unit provides integrated ORF cloning services and yeast two-hybrid screening.

The RC also frequently facilitates other researchers regarding bioinformatics approaches for gene expression analysis, contig and genome assembly, and physical map assembly and prediction, SNP and variome analysis, annotation as well as fingerprinting and SNP detection methods for genome dynamics analyses. These will also be further developed. The new technologies (Illumina HiScanSQ) will open novel possibilities to combine genome sequence and expression analysis with genotyping. This enables the RC both rapidly go forward in solving research questions and simultaneously train students and scientists to take advantage of the most modern technologies.

In addition to large centralized units, each group has excellent operational conditions at the campus with an access to other important services, such as light and electron microscopy, and to structural biology platforms. The individual groups within the RC also have complementary expertise that lowers the barriers to form collaboration projects within the RC. This expertise will be further strengthened by a recent recruit, Dr. Thomas Sandman, to the Genome biology program at the Institute of Biotechnology. Upon his arrival at late 2011, the unit will receive an additional boost in research based on genome-wide high-throughput screening.

balance between research and teaching duties:



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Based on the strategic role of the Institute of Biotechnology as well as research emphasized positions for most of the PIs, the RC can be considered as a research intensive unit with an active role in teaching.

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

The key strengths related to the operational conditions relate to the excellent mix of specialized research groups whose research tackles very complementary subjects, thus strengthening the overall know-how of the RC. Most of the challenges relate to practical questions of the sophisticated instrumentation and their operation. Instrumentation needs constant maintenance, upgrade and service. Highly skilled and trained personnel need financial security in their career.

An additional operational challenge is the huge data amount of being generated, which necessitates e.g. in-house computing units with large back-up systems, and human resources. Maintaining the data and keeping the supporting platforms updated needs resources that can be partially obtained through collaboration within the RC and partially from external services. Given the uncertainties in research funding, this system has vulnerabilities that need to be solved.

To resolve some of the issues raised above, the RC would allocate some common resources potentially obtained through the current Evaluation to match these need

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

• Description of the execution and processes of leadership in the RC, how the management-related responsibilities and roles are distributed in the RC and how the leadership- and management-related processes support high quality research, collaboration between principal investigators and other researchers in the RC, the RC's research focus and strengthening of the RC's know-how. As discussed above (1) the RC is an academic network, where the participants come from the various organizational units at the University and they have distinct academic goals. On the other hand, as also highlighted in (1), there are many on-going joint projects, even joint publications with several PIs of the RC involved. Therefore, the leadership depends on the project; there is no individual leader for the RC.

For managing the RC, several forums exist for scientific interactions. An important organizational unit of the RC is the Genome Biology Program of the Institute of Biotechnology (established 2010). YH is the head of the program and has taken here the executive role in describing the RC. PA, MF, LH, AS and the Genome Biology Unit of the Institute of Biotechnology affiliated with TM belong to this unit. As described above (1), a prominent activity of this RC is to collaborate on various integrated genome projects, such as on Glanville butterfly, with IH as the PI. In addition, there are other researchers on the Viikki campus (such as Jaakko Kangasjärvi, the PI of the Betula genome sequencing project) closely interacting with the unit. The unit holds regular meetings to discuss strategies and management issues. Another important forum is the Genetics and Genomics research program, which organizes regular open campus-wide meetings. MF is the vice-chair of that organization.

 RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes.
We envision that the genome biology approach is becoming more popular on the campus. This may create needs for new forms of interaction. One such possible form that was successfully employed early 2000s when various EST sequencing projects took off was the working group concept. This was an open



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forum for methodologically parallel sequencing projects to discuss management at various levels ranging from laboratory related issues to bioinformatics and data storage. We envision similar working group concept being helpful for the future parallel genome projects.

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: 10885170 EUR
- 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: 1554879 EUR
- 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: 2308772 EUR
- 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: 2478999 EUR
- 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: Maj and Tor Nessling Foundation, Juselius Foundation, Syöpäsäätiö
 - total amount of funding (in euros) from the above-mentioned foundations: 834528 EUR
- 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: EUYRI, Human Frontier Science Program, National Science Foundation
 - total amount of funding (in euros) from the above-mentioned funding organizations: 482782 EUR
- 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: MinEdu, Luova, CIMO, Evo, HUCH
 - total amount of funding (in euros) from the above-mentioned funding organizations: 1853106 EUR

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 Genome Biology Research Community continues to carry out and initiate yet new integrated projects (see (1) for details). We envisage even more genome sequencing projects. Once a draft



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sequence of a genome has been obtained, work goes on towards aligning and linking the genetic and physical maps, as well as towards understanding the role of polymorphisms at the DNA sequence (and epimarks) in contributing to the variation at the phenotypic level and to genotype x environment interactions. We feel we have a strong and diverse group equal to this challenge. In this scheme, it is also valuable to have members, such as TM and Thomas Sandmann (a new recruit to the Genome Program at the Institute of Biotechnology starting May 2011; see (5)) that are involved in the human and primate genomics, the ultimate drivers of developments in genome biology. They provide new technologies and strategies that can be applied in the functional genomics of the other species.

As highlighted in this document, a central aspect of the rise of the genome biology has been a paradigm change at the experimental level. The RC as it stands right now consists of principal investigators that have made the transition from more traditional disciplines to genome biology, involving the high throughput technology etc. It is obvious that a successful RC would benefit from recruiting additional, preferably young members who have established themselves by working on genome biology in some internationally leading laboratories. Therefore, we are actively looking for yet new, dynamic members to join our community.

Another aspect central to the RC is to continue developing strong interactions with some related high throughput technologies on campus; these include the proteomics, bioimaging, and metabolomics centers associated with the Institute of Biotechnology or Department of Biosciences. Furthermore, as indicated in (4), through this RC we are excited about the possibility to enhance interaction with the research communities on ecological and environmental biology which are strong in theoretical approaches and bioinformatics.

Technological development is a key factor driving the current genomic biology expansion. Even though the RC is in charge of excellent infrastructure, the rapid development in the instrumentation requires constant readiness for upgrades and new methodologies. The RC has already been active for the near future strategy (e.g. 2011-2014). IH and PA have secured a large infrastructure funding (~1.4 M€) for upgrading the genotyping and DNA sequencing facilities with Illumina HiScan genotyping instrumentation, and with a single-molecule DNA sequencer (Pacific Biosciences sequencer, or a similar instrument). These infrastructure upgrades will allow further increase the expertise in genome biology. Further upgrades will be considered together with other local operations (e.g. Finnish Institute of Molecular Medicine, FIMM, which is also very active in medical genome biology applications). Additional technological considerations are the requirements imposed by very large datasets generated by the instrumentation. Their storage, handling and backup services require a significant additional attention to computation and networking hardware.

Besides the computational hardware, there is also a need for bioinformatics specialists, in particularly if and when the demand for genome-wide approaches increases outside of the core RC. It would be very useful to consider establishment of a bioinformatics core unit that could serve the local community with their basic bioinformatic needs. Such an plan would probably need a concerted campus-wide action in recruiting suitable individuals, but the RC could have a decisive role in planning of such a development.

During 2011-13, we will also continue to develop and integrate the education related to genome biology. We envision ourselves as a visible international player and partner in integrative biology creating possibilities for students and mobility.

9 Short description of how the RC members have contributed to the compilation of the stage 2 materials (max. 1100 characters with spaces).



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Since this is a relatively small community of principal investigators, everyone participated actively and equally in writing this document.



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1 Analysis of publications

- Associated person	is one of Alan Schulman ,	Ruslan Kalendar		Marko Jääskeläinen ,	
	Wei Chang ,	Jaakko Antero Tanska	nen,	Liisa Holm ,	
Petri Törönen,	Matti Kankainen ,	Yrjö	Helariutta,	Anthony Bishopp,	
	Jan Dettmer,	Annakaisa Elo ,	Kamil Ruz	ticka, J	ling Zhang ,
	Shri Ram Yadav ,	Anne Vaten,	Juha Immanen,	Hanna H	lelp,
	Raffael Lichtenberger,	Robertas Ur	sache,	Mikko Frilander,	
	Xiaojuan Meng, Heli Pessa ,	Janne Turu	nen,	Elina Niemelä,	
Jens Verbeeren,	Jouni Kvist ,	Petri Auvin	en,	Lars Göran Paulin ,	
Kaisa Koskinen,	Jarmo Ritari,	Miia Jo	nanna Pitkäranta ,	Rauno Matti Ed	ward Alatalo
,	Dario Greco,	Jenni Hultman,	Rashi Gup	ta, Tomi Mäkelä ,	
llkka Hanski ,					

Publication year

Publication type	2005	2006	2007	2008	2009	2010	Total Count 2005 - 2010
A1 Refereed journal article	25	30	29	40	41	36	201
A2 Review in scientific journal		3			1	4	8
A3 Contribution to book/other compilations (refereed)	2	3		3	4		12
A4 Article in conference publication (refereed)	3	1	1		1	1	7
B1 Unrefereed journal article	-	1	1	2	2	3	9
C1 Published scientific monograph	1		3		1		5
C2 Edited book, compilation, conference proceeding or special issue of journal					1		1
D2 Article in professional hand or guide book or in a professional data system, or text book material			1				1
D4 Published development or research report			1				1
D5 Text book or professional handbook or guidebook or dictionary		1					1
E1 Popular article, newspaper article		1	2				3
E1 Popular contribution to book/other compilations						1	1
E2 Popular monograph		1					1



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2 Listing of publications

A1 Refereed journal article

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A3 Contribution to book/other compilations (refereed)

2005

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A4 Article in conference publication (refereed)

2005

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B1 Unrefereed journal article

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pp. R843-R845.

C1 Published scientific monograph

2005

Hanski, I 2005. The shrinking world: Ecological consequences of habitat loss, EXCELLENCE IN ECOLOGY , vol. 14, International Ecology Institute, Oldendorf (Luhe).

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

2009

Hanski, I, Niiniluoto, I, Hetemäki, I (eds) 2009, Kaikki evoluutiosta, Gaudeamus, Helsinki.

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

2007

Greco, D, Somervuo, PJ, Raitila, TT, Auvinen, P 2007, 'Unique expression fingerprints of human tissues', CSC Report on Computational Science in Finland 2006-2007.



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D4 Published development or research report

2007

Aittamaa, M, Auvinen, P, Hinderink, K, Kiviniemi, K, Korkeala, H, Leppäranta, O, Lindström, M, Mattila, M, Myllys, V, Nykäsenoja, S, Rantala, L, Somervuo, P, Söderholm, H, Valkonen, J **2007**, Bakteeritaudinaiheuttajien tarkennettu tunnistus mikrosirudiagnostiikalla: loppuraportti, Helsingin yliopisto, soveltavan biologian laitos, kasvipatologian laboratorio, Helsinki.

D5 Text book or professional handbook or guidebook or dictionary

2006

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E1 Popular article, newspaper article

2006

Aalto, A, Ihaksi, T, Ikävalko, J, Karjalainen, J, Keinänen, M, Kiljunen, M, Kiviranta, H, Koskinen, K, Malinen, E, Peltonen, H, Suni, S, Verta, M, Vuorinen, PJ, Romantschuk, M 2006, 'Itämeren myrkkyuhat: kaksi esimerkkitapausta', Vesitalous, vol 47, no. 2, pp. 15-19.

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Hanski, I, Hottola, J, Kuuluvainen, T, Mäkipää, R, Ovaskainen, O, Tahvonen, Ol 2007, 'Keskustelussa metsien kestävästä käytöstä ja suojelusta on sivuutettu olennaisia kysymyksiä', Tieteessä tapahtuu, vol 25, no. 5, pp. 41-44.

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E1 Popular contribution to book/other compilations

2010

Hanski, I 2010, 'Hupeneva luonnon monimuotoisuus ihmisen pahin uhka', Studia Generalia. Hyvää elämää etsimässä., vol. 44, pp. 45-61.

E2 Popular monograph

2006

Jalonen, R (ed.), Hanski, I (ed.), Kuuluvainen, T (ed.), Nikinmaa, E, Pelkonen, P (ed.), Puttonen, P (ed.), Raitio, K (ed.), Tahvonen, OI (ed.) 2006, Uusi metsäkirja, Gaudeamus, Helsinki.



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

ViiGen/Helariutta

1 Analysis of activities 2005-2010

Wei Chang, Jaakko Antero Tanskanen, Liisa Holm, Petri Törönen, Mati Kankainen, Yrjö Helariutta, Anthony Bishopp, Jan Dettmer, Annakaisa Elo, Kamil Ruzicka, Jing Zhang Shri Ram Yadav, Anne Vaten, Juha Immanen, Hanna Help, Raffael Lichtenberger, Robertas Ursache, Mikko Frilander, Xiaojuan Meng, Heil Pessa, Janne Turunen, Elina Niemelä, Jarno Strberen, Jouni Kvist, Petri Auvinen, Lars Göran Paulin, Kaisa Koskinen, Jarno Ritari, Mili Johanna Pitkäranta, Rauno Matti Edward Alatz Activity type Count Supervisor or co-supervisor of doctoral thesis 34 Prizes and awards 19 Editor of research journal 24
Petri Toronen, Matti Kankainen, Yng Heianutta, Anthony Bishopp, Jan Dettmer, Annakaisa Elo, Kamil Ruzicka, Jing Zhang Shri Ram Yadav, Anne Vaten, Juha Immanen, Hanna Help, Raffael Lichtenberger, Robertas Ursache, Mikko Frilander, Elina Niemelä, Jane Verbeeren, Jouni Kvist, Petri Auvinen, Lars Göran Paulin, Kaisa Koskinen, Jarmo Ritari, Miia Johanna Pitkäranta , Rauno Matti Edward Alata , Ikka Hanski, Count Supervisor or co-supervisor of doctoral thesis Count Supervisor or co-supervisor of doctoral thesis 204 Prizes and awards 204 Prizes
Athrikadias Elo, Anim Kuzika, Jing Zhang Shri Ram Yadav, Anne Vaten, Juha Immanen, Hainna Help, Raffael Lichtenberger, Kobertas Ursache, Mikko Frilander, Xiaojuan Meng, Heil Pessa, Janne Turunen, Elina Niemelä, Jens Verbeeren, Jouni Kvist, Petri Auvinen, Lars Göran Paulin, Kaisa Koskinen, Jarmo Ritari, Milia Johanna Pitkäranta, Rauno Matti Edward Alata , Dario Greco, Jenni Hultman, Rashi Gupta, Tomi Mäkelä, Ilkka Hanski, Activity type Count Supervisor or co-supervisor of doctoral thesis 34 Prizes and awards 19 Editor of research journal 24 Peer review of manuscripts 62
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Rainable Licenteriberger, Robertas Ursache, Minko Frilander, Xiaojuan Meng, Heli Pessa, Janne Turunen, Elina Niemelà, Jens Verbeeren, Jouni Kvist, Petri Auvinen, Lars Göran Paulin, Kaisa Koskinen, Jarmo Ritari, Mina Johanna Pitkäranta, Rauno Matti Edward Alata , Dario Greco, Jenni Hultman, Rashi Gupta, Tomi Mäkelä, Ilikka Hanski, Count Supervisor or co-supervisor of doctoral thesis 34 Prizes and awards 19 Editor of research journal 24
Alaquan Meng, Hein Pessa, Jahne Turunen, Leina Niemela, Jens Verbeeren, Jouni Kvis, Petri Auvinen, Lars Göran Paulin, Kaisa Koskinen, Jarmo Ritari, Milia Johanna Pitkäranta, Rauno Matti Edward Alata , Dario Greco, Jenni Hultman, Rashi Gupta, Tomi Mäkelä, Ilkka Hanski, Activity type Count Supervisor or co-supervisor of doctoral thesis 34 Prizes and awards 19 Editor of research journal 24 Peer review of manuscripts 62
Jens Verbeeren , Jouri Kvist , Petri Auvinen , Lars Goran Paulin , Kaisa Koskinen , Jarmo Ritari , Milia Johanna Pitkäranta , Rauno Matti Edward Alata , Dario Greco , Jenni Hultman , Rashi Gupta, Tomi Mäkelä , Itka Hanski , Activity type Count Supervisor or co-supervisor of doctoral thesis 34 Prizes and awards 19 Editor of research journal 24
Kaisa Koskinen, Jarmo Ritari, Miia Johanna Pitkäranta, Rauno Matti Edward Alata , Dario Greco, Jenni Hultman, Rashi Gupta, Tomi Mäkelä, Activity type Count Supervisor or co-supervisor of doctoral thesis 34 Prizes and awards 19 Editor of research journal 62
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Membership or other role in research network 11
Membership or other rele in national/international committee, acural board
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Membership or other role in public Finnish or international organization 9
Membership or other role of body in private company/organisation 2
Participation in interview for written media
Participation in radio programme 2
Participation in TV programme
Participation in Ly programme 2
Participation in interview for web based media 2

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

ViiGen/Helariutta

2 Listing of activities 2005-2010

Supervisor or co-supervisor of doctoral thesis

Alan Schulman,

Supervisor of Doctoral thesis, Alan Schulman, 2008 \rightarrow ...

Supervisor of Doctoral thesis, Alan Schulman, 2008 $\rightarrow \ldots$

Supervisor of Doctoral thesis, Alan Schulman, $2009 \rightarrow \dots$

Ruslan Kalendar,

Molecular-genetic analysis of the diversity of rear and endemic plant species of Perm aria, Ruslan Kalendar, 2009, Russia

Yrjö Helariutta,

Supervised doctoral dissertation, Yrjö Helariutta, 2005

Supervised doctoral dissertation, Yrjö Helariutta, 2009, Finland

Mikko Frilander,

Supervisor of Doctoral thesis, Mikko Frilander, 2010

Petri Auvinen,

Co-supervisor of Doctoral thesis, Petri Auvinen, 2006, Finland Co-supervisor of Doctoral thesis, Petri Auvinen, 2009, Finland Co-supervisor of Doctoral thesis, Petri Auvinen, 2009, Finland Supervisor of Doctoral thesis, Petri Auvinen, 2009, Finland

Tomi Mäkelä ,

Supervision of PhD thesis/Helenius Katja, Tomi Mäkelä, $2005 \rightarrow \dots$ Supervision of PhD thesis/Kovac Bianca, Tomi Mäkelä, $2005 \rightarrow \dots$ Supervision of PhD thesis/Kuuluvainen Emilia, Tomi Mäkelä, $2005 \rightarrow \dots$ Supervision of PhD thesis/Laajanen Kaisa, Tomi Mäkelä, $2005 \rightarrow \dots$ Supervision of PhD thesis/Udd Lina, Tomi Mäkelä, $2005 \rightarrow \dots$ Supervision of PhD thesis/Vaahtomeri Kari, Tomi Mäkelä, $2005 \rightarrow \dots$ Supervision of PhD thesis/Ying Yang, Tomi Mäkelä, $2005 \rightarrow \dots$ Supervision of PhD thesis/Westerling, Thomas, Tomi Mäkelä, 2006Supervision of PhD thesis/Katajisto, Pekka, Tomi Mäkelä, 2008

Ilkka Hanski,

Doctoral student supervisor, Anna-Liisa Laine, Ilkka Hanski, 2000 → 2005, Finland Doctoral student supervisor, Juha Pöyry, Ilkka Hanski, 2000 → 2008, Finland Doctoral student supervisor, Reijo Penttilä, Ilkka Hanski, 2000 → 2006, Finland Doctoral student supervisor, Tarja Latva-Karjanmaa, Ilkka Hanski, 2000 → 2006, Finland Doctoral student supervisor, Alia Austin (Sarhan), Ilkka Hanski, 2001 → 2006, France Doctoral student supervisor, Jenni Hottola, Ilkka Hanski, 2003 → 2009, Finland Doctoral student supervisor, Varpu Mitikka, Ilkka Hanski, 2003 → 2010, Finland Doctoral student supervisor, Varpu Mitikka, Ilkka Hanski, 2003 → 2010, Finland Doctoral student supervisor, Heidi Viljanen, Ilkka Hanski, 2004 → 2010, Finland Doctoral student supervisor, Helena Wirta, Ilkka Hanski, 2004 → 2009, Finland Doctoral student supervisor, Marjo Saastamoinen, Ilkka Hanski, 2004 → 2007, Finland Doctoral student supervisor, Kristian Niitepõld, Ilkka Hanski, 2005 → 2010, Finland



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Doctoral student supervisor, Jouni Kvist, Ilkka Hanski, 2006 \rightarrow ..., Finland Doctoral student supervisor, Anniina Mattila, Ilkka Hanski, 2010 \rightarrow ..., Finland Doctoral student supervisor, Tanjona Ramiadantsoa, Ilkka Hanski, 2010 \rightarrow ..., Madagascar

Prizes and awards

Alan Schulman , Knight, First Class, Order of the Lion of Finland, Alan Schulman, 2010 \rightarrow ...

Marquis Who's Who in the World, Alan Schulman, 2010 \rightarrow ...

Yrjö Helariutta,

European Young Investigator Award (EURYI), Yrjö Helariutta, 2005

EMBO Membership Award, Yrjö Helariutta, 2008

Mikko Frilander,

A Distinction awarded for supervising M.Sc. thesis work, Faculty of biosciences, University of Helsinki, Mikko Frilander, 2006

Tomi Mäkelä ,

Membeship of the Finnish Academy of Science and Letters, Tomi Mäkelä, $2002 \rightarrow ...$ Anders Jahre Young Investigator Award, Tomi Mäkelä, 01.01.2005, Norway Ilkka Hanski ,

Honorary professorship, Ilkka Hanski, 2003 → ..., China Honorary membership of a student association, Ilkka Hanski, 2005 → ..., Finland Marsh Award for Ecology, Ilkka Hanski, 2005, United Kingdom Science Award of the City of Helsinki, Ilkka Hanski, 2005, Finland Award of a college in Helsinki, Ilkka Hanski, 2006, Finland E.J. Nyström Prize, Ilkka Hanski, 2007, Finland Finnish Science Award, Ilkka Hanski, 2007, Finland Finnish State Prize for Dissemination of Information, Ilkka Hanski, 2007, Finland Nonfiction literature prize for the book Viestejä Saarilta, Ilkka Hanski, 2008, Finland Honorary doctorate, Ilkka Hanski, 2010, Norway Latsis Prize of the European Science Foundation, Ilkka Hanski, 17.11.2010 The Environment Award of the Finnish Association for Nature Conservation, Ilkka Hanski, 2010, Finland

Editor of research journal

Alan Schulman,

Member of editorial board, Repbase Reports, Alan Schulman, 2000 $\rightarrow \dots$

Member of editorial board, Genome Letters, Alan Schulman, 2001 $\rightarrow \ldots$

Member of editorial board, Genomics Reports, Alan Schulman, 2001 \rightarrow 2006

Member of editorial board, Repbase Update (electronic journal), Alan Schulman, 2001 $\rightarrow \dots$

Member of editorial board, Genetica, Alan Schulman, 2005 $\rightarrow \dots$

Member of Editorial Board, Theoretical and Applied Genomics, Alan Schulman, 2006 $\rightarrow \dots$

Yrjö Helariutta ,

Development, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006

FEBS Letters, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006

Journal of Experimental Botany, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006



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Journal of Molecular Biology, Yriö Helariutta, 01.01.2006 → 31.12.2006 PNAS, Yrjö Helariutta, 01.01.2006 → 31.12.2006 Physiologia Plantarum, Yrjö Helariutta, 01.01.2006 → 31.12.2006 Plant Cell, Yrjö Helariutta, 01.01.2006 → 31.12.2006 Plant Cell & amp; Physiology, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006 Plant Journal, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006 Plant Physiology, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006 Planta, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006 Plant Cell and Physiology, Yrjö Helariutta, 2008 $\rightarrow \dots$ Physiologia Plantarum, Yrjö Helariutta, 2009 $\rightarrow \dots$ Plant Molecular Biology, Yrjö Helariutta, 2009 $\rightarrow \dots$ Petri Auvinen, Archives of Oral Biology, Petri Auvinen, 01.01.2006 \rightarrow 31.12.2006 Tomi Mäkelä . Editorial Board Member/Duodecim. Tomi Mäkelä. 2001 → ... Biomedicine editor, Finnish Medical Journal Duodecim, Tomi Mäkelä, 01.01.2002 → 31.12.2009, Finland Editorial Board Member, "Scientific Reports", Nature Publishing Group, Tomi Mäkelä, 06.12.2010 → ..., United Kingdom Peer review of manuscripts Alan Schulman, Reviewer, Hereditas, Alan Schulman, 1993 $\rightarrow \dots$ Reviewer, Physiologia Plantarum, Alan Schulman, 1995 $\rightarrow \dots$ Reviewer, Plant Molecular Biology, Alan Schulman, 1995 $\rightarrow \dots$ Reviewer, The Plant Journal, Alan Schulman, 1998 $\rightarrow \dots$ Reviewer, Plant Physiology, Alan Schulman, 1999 $\rightarrow \dots$ Genetics, Alan Schulman, 01.01.2000 → ..., United States Reviewer, The Plant Cell, Alan Schulman, 2000 $\rightarrow \dots$ Reviewer, Trends in Plant Science, Alan Schulman, 2000 $\rightarrow \dots$ Reviewer, Biological Journal of the Linnean Society, Alan Schulman, 2001 \rightarrow ... Reviewer, Nature Genetics, Alan Schulman, 2001 → ... Reviewer, Genome, Alan Schulman, 2002 → ... Reviewer, Proceedings of the National Academy of Sciences (USA), Alan Schulman, 2002 → ... Reviewer, Australian Journal of Agricultural Research, Alan Schulman, 2003 → ... Reviewer, Molecular and General Genomics, Alan Schulman, 2003 $\rightarrow \dots$ Reviewer, Biology Letters, Royal Society London, Alan Schulman, 2004 $\rightarrow \dots$, United Kingdom Ruslan Kalendar, Molecular Ecology, Ruslan Kalendar, 2004 $\rightarrow \ldots$, United Kingdom Tree Genetics & amp; Genomes, Ruslan Kalendar, 2004 $\rightarrow \dots$, Germany Bioinformatics, Ruslan Kalendar, 2005 $\rightarrow ...,$ United Kingdom Plant Genetic Resources, Ruslan Kalendar, 09.05.2005, United Kingdom Plant Systematics and Evolution, Ruslan Kalendar, 2005 → ..., Germany Theoretical and Applied Genetics, Ruslan Kalendar, 2005 → ..., Germany



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Annals of Botany, Ruslan Kalendar, 2006 → ..., United Kingdom Chromosome Research, Ruslan Kalendar, 2006 → ..., Germany BMC Genomics, Ruslan Kalendar, 2007 $\rightarrow ...,$ United Kingdom Nucleic Acids Research, Ruslan Kalendar, 2007 → ..., United Kingdom Biologia Plantarum, Ruslan Kalendar, 2008 $\rightarrow ...,$ Czech Republic Fellowships and Research Grant Evaluations for National Research Foundation South Africa, Ruslan Kalendar, 15.07.2008, South Africa Fellowships and Research Grant Evaluations for the Center for Complexity Science (CCS) grant program (Jerusalem), Ruslan Kalendar, 21.05.2008, Israel Genetica, Ruslan Kalendar, 2008 $\rightarrow \dots$, Germany Molecular Breeding, Ruslan Kalendar, 2008 $\rightarrow \dots$, Germany Molecular Genetics and Genomics, Ruslan Kalendar, 2008 \rightarrow ..., Sweden Plant Breeding, Ruslan Kalendar, 2008 $\rightarrow \dots$, Germany Fellowships and Research Grant Evaluations for Czech Science Foundation, Ruslan Kalendar, 29.04.2009, Czech Republic New Phytologist, Ruslan Kalendar, 2009 $\rightarrow \dots$, United Kingdom Yrjö Helariutta, Plant Physiology, Yrjö Helariutta, 2000 → 2010 Plant Journal, Yrjö Helariutta, 2002 → 2010 Development, Yrjö Helariutta, 2005 → 2010 Genes & amp; Development, Yrjö Helariutta, 2005 → 2009 Plant Cell, Yrjö Helariutta, 2005 → 2010 Plant Molecular Biology, Yrjö Helariutta, 2005 Planta, Yrjö Helariutta, 2006 → 2007 Proc. Natl. Acad. Sci. USA, Yrjö Helariutta, 2006 \rightarrow 2010 Current Biology, Yrjö Helariutta, 2008 \rightarrow 2010 Trends in Plant Sciences, Yrjö Helariutta, 2008 Cell, Yrjö Helariutta, 2009 Nature Genetics, Yrjö Helariutta, 2009 Science, Yrjö Helariutta, 2009 Anthony Bishopp, Physiologia Plantarum, Anthony Bishopp, 2009 International Journal of Plant Sciences, Anthony Bishopp, 2010 Kamil Ruzicka . Plant Growth Regulation, Plant Cell, Development, Current Biology, Developmental Cell, Kamil Ruzicka, 2009 → 2011 Shri Ram Yaday . International Journals of Plant Sciences, Shri Ram Yadav, 10.12.2009 \rightarrow 18.01.2011 Juha Immanen . avustava arvioitsija mm. Plant Cell, PNAS, Plant Journal, BCM Genomics lehdissä, Juha Immanen, 01.01.2005 → ... Mikko Frilander . Reviewer; Bioinformatics, Cell, Gene, Molecular Cell, Nucleic Acids Research, PNAS, RNA, Science, Mikko Frilander, 2005 → 2010



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Tomi Mäkelä,

Ad hoc referee: Science, Molecular Cell, Nature Genetics; EMBO Journal; Molecular Biology of the Cell; Oncogene; Drug Discovery Today; FEBS Letters; EMBO Reports; Human Molecular Genetics; PNAS, Journal of Cell Science; GUT; Gastroenterology, Tomi Mäkelä, 2005 \rightarrow ...

Ilkka Hanski,

Oecologia, Ilkka Hanski, 1991 \rightarrow 2007, Germany

Annales Zoologici Fennici, Ilkka Hanski, 01.01.1993 $\rightarrow \ldots$, Finland

Acta Theriologica, Ilkka Hanski, 1999 $\rightarrow \dots$

Global Change Biology, Ilkka Hanski, 1999 \rightarrow 2008

Journal of Insect Conservation, Ilkka Hanski, 1999 $\rightarrow \dots$, Netherlands

Oikos, Ilkka Hanski, 1999 \rightarrow 2006

Trends in Ecology and Evolution, Ilkka Hanski, 2000 $\rightarrow \dots$

EMBO Reports, Ilkka Hanski, 2010 $\rightarrow \dots$

Assessment of candidates for academic posts

Tomi Mäkelä ,

Docent review, 6 times 2005-2010 in Finnish universities, Tomi Mäkelä, 2005 \rightarrow 2010, Falkland Islands EMBO Long-term Fellowship assessment: 2005, 2007, Tomi Mäkelä, 2005 \rightarrow 2007 ERC grant reviewer, Tomi Mäkelä, 10.2010 \rightarrow 31.12.2013

Membership or other role in review committee

Petri Auvinen,

Member of the evaluation panel for FUGE program, Petri Auvinen, 2006

Tomi Mäkelä ,

Chairman, review committee for UH Medical Fund, Tomi Mäkelä, $2004 \rightarrow 2005$

Instrumentarium Science Foundation Review Committee, Tomi Mäkelä, 2007 ightarrow 2030

Dutch Digestive Foundation, Grant Reviewer 2008, Tomi Mäkelä, 2008

Ilkka Hanski ,

Chair of the Ecology and Evolutionary Biology panel of the European Research Council (Starting grants, LS8), Ilkka Hanski, 2007 \rightarrow 2010, Finland

Membership or other role in research network

Alan Schulman,

Member of Maize Genetics Cooperation, Alan Schulman, 1981 $\rightarrow \dots$

Member of Barley Genome Net, Alan Schulman, 2006 $\rightarrow \dots$

Yrjö Helariutta,

Member of the Biocentrum Helsinki Center of Excellence, Yrjö Helariutta, 2001 \rightarrow 2009

Member of Plant Signalling Research, Yrjö Helariutta, 2006 \rightarrow 2011

Mikko Frilander,

Member of NordForsk RNA biology network, Mikko Frilander, 2006 \rightarrow 2010

Member of steering board of NordForsk network RNA biology, Mikko Frilander, 2006 \rightarrow 2010

Biocentrum Helsinki member, Mikko Frilander, 2007 $\rightarrow \dots$

Tomi Mäkelä ,

Coordinator, Biocentrum Helsinki Systems Biology Initiative, Tomi Mäkelä, 01.01.2005 → 01.01.2007



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ENFIN FP6 Network of Excellence, Tomi Mäkelä, 2006 \rightarrow 2011

Vice Director, Center of Excellence in Translational Genome-Scale Biology, Tomi Mäkelä, 2006 \rightarrow 2011 Chair, Biocenter Finland Genome-Wide Methods Network, Tomi Mäkelä, 2007 \rightarrow 2012

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

Alan Schulman,

SAB member of Boreal Plant Breeding Ltd, Alan Schulman, 2001 \rightarrow 2005

Board Member (representing Scandinavia), International Barley Genetics Symposium, Alan Schulman, 2004 → 2011

Founding Member of European Triticeae Genomics Initiative, Alan Schulman, 2005 \rightarrow ...

Member of MTT ad hoc committee to plan new Food & Biotechnology Division, Alan Schulman, 2005 → ...

Founding Member, International Barley Sequencing Consortium, Alan Schulman, 2006 $ightarrow \dots$

Member of National Advisory Board on food, agro, fisheries, biotech -thematic programs of EU FP7, Alan Schulman, 2006 → ...

Expert advisor, Gene Technology Board, Alan Schulman, 2007 $\rightarrow \dots$

Member of Organizing Committee, Plant GEM, Alan Schulman, 2010 $\rightarrow \dots$

Ruslan Kalendar,

EUCARPIA (European Association for Plant Breeding Research), Ruslan Kalendar, 2006 -----, Hungary

The Scientific Advisory Board, Ruslan Kalendar, 2006 $\rightarrow \dots$, United States

Docentship organisation in University of Helsinki, Ruslan Kalendar, 2007 \rightarrow ..., Finland

Yrjö Helariutta ,

Coordinator of a discussive forum including forest molecular biologists, forest breeders, wood & amp; pulping scientists in Finland, Yrjö Helariutta, 2000 \rightarrow ..., Finland

Board member: Viikki Graduate School of Biosciences, Yrjö Helariutta, 2002 $\rightarrow \dots$, Finland

Alberta Ingenuity Funds, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006

NSF, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006

Norwegian Research Council, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006

Swiss National Academy of Sci, Yrjö Helariutta, 01.01.2006 \rightarrow 31.12.2006

Mikko Frilander,

Board member, Viikki Campus education development services (VOK) advisory board, Mikko Frilander, 2005 Vice-chair of the Genetics and genomics program, Viikki Research group organization, Mikko Frilander, 2009 \rightarrow ... Member of Selection committee for lecturer in human genetics, University of Helsinki, Mikko Frilander, 2010

Petri Auvinen .

Norja FUGE -paneeli, Petri Auvinen, 01.01.2006 \rightarrow 31.12.2006, Norway

Member of managing committee of the COST action TD0801 and cheir of WG1, Petri Auvinen, 2009 \rightarrow 2011

Member of the advisory board of Metropolia Polytechnic, Petri Auvinen, $2009 \rightarrow 2011$

Member of the managing committee of the COST action TD0801, Petri Auvinen, 2010 \rightarrow ...

Tomi Mäkelä,

Steering Group member, MD PhD program, Faculty of Medicine, Tomi Mäkelä, 01.01.1996 \rightarrow 31.12.2007, Finland Member, Biocentrum Helsinki, Tomi Mäkelä, 1998 \rightarrow 31.12.2013, Finland Board Member, Meilahti Animal Facility, Tomi Mäkelä, 01.01.2001 \rightarrow 31.12.2006, Finland Faculty of Medicine Postgraduate Education Committee, Tomi Mäkelä, 01.01.2003 \rightarrow 31.12.2006, Finland

SAB, Wihuri Research Foundation, Tomi Mäkelä, 01.01.2003 → 31.12.2011, Finland

Scientific Advisory Board Member, Tomi Mäkelä, 2003 $\rightarrow \dots$



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Faculty of Medicine Research Council, Tomi Mäkelä, 01.01.2004 → 30.06.2009, Finland SAB, Finnish Cancer Institute, Tomi Mäkelä, 01.01.2004 → 31.12.2011, Finland Scientific Advisory Board Member, Tomi Mäkelä, 2004 → ... Chair, organizing committee, BioFinland 2005, Tomi Mäkelä, 26.04.2005 → 27.04.2005 FinnSight2015 National Health Panel Member, Tomi Mäkelä, 01.01.2005 → 31.12.2005, Finland Steering Group, Masters Program in Bioinformatics, UH, Tomi Mäkelä, 01.01.2005 \rightarrow 31.12.2011, Finland Center of Excellence in Translational Genome-Scale Biology, Tomi Mäkelä, 01.01.2006 → 31.12.2011, Finland Graduate School System Planning Group, HEA, Ireland, Tomi Mäkelä, 28.02.2006 → 21.09.2006, Ireland Initiator, LERU Biomedical Graduate Program, Tomi Mäkelä, 2006 \rightarrow 2007, Finland Initiator, joint doctoral degree program, Karolinska-UH, Tomi Mäkelä, 2006 \rightarrow 2007, Sweden Member of FinnSight2015 National Health Panel, Tomi Mäkelä, 2006 Support Group for EU FP7 Health Area in Finland, Tomi Mäkelä, 2006 \rightarrow ... UH Research Information System TUHAT: chair 06-08, coordination group 10-, Tomi Mäkelä, 2006 → 2011 Chairman of the Board, Helsinki Biomedical Graduate School, Tomi Mäkelä, 2007 → ... Member of the steering committee for The Master's Degree Program in Translational Medicine, Tomi Mäkelä, 2008 → 2013 Organizing committee, CNIO Cancer Conference: signalling upstream of mTOR, Tomi Mäkelä, 03.11.2008 → 05.11.2008, Spain TRANSMED Translational Masters Program, multiple roles, Tomi Mäkelä, 2008 Chairman, JURE task force for national publication registry in Finland. Tomi Mäkelä, 2009 \rightarrow ... Board member of the Bioinformatics Masters Program, Tomi Mäkelä, 2010 Host, UH Honorary Doctor Robert A, Weinberg, Tomi Mäkelä, 03.06.2010 Organizing committee, ENFIN-EMBRACE workshop, Tomi Mäkelä, 05.10.2010 → 06.10.2010, Finland Ilkka Hanski . International Ecology Institute, Ilkka Hanski, 1993 $\rightarrow \dots$ Member of the Academia Europaea, Ilkka Hanski, 1998 $\rightarrow \dots$, United Kingdom Foreign Member of the Royal Swedish Academy of Sciences, Ilkka Hanski, 2000 $\rightarrow ...$, Sweden Board member of Finnish Cultural Foundation, Ilkka Hanski, 2001 \rightarrow 2010, Finland Member of the Finnish Academy of Science and Letters, Ilkka Hanski, 2001 \rightarrow ..., Finland Foreign Member of Deutsche Akademie der Naturforscher Leopoldina, Ilkka Hanski, 2002 → ..., Germany Member of the Advisory Board of the UK Population Biology Network, Ilkka Hanski, 2004 → 2007, United Kingdom Foreign Member of the Royal Society, Ilkka Hanski, 2005 \rightarrow ..., United Kingdom Honorary Foreign Member of the American Academy of Arts & amp; Sciences, Ilkka Hanski, 2006 → ..., United States Corresponding Fellow of the Royal Society of Edinburgh, Ilkka Hanski, 2007 \rightarrow ..., United Kingdom Foreign associate of the National Academy of Sciences, Ilkka Hanski, 2010 → ..., United States

Membership or other role in public Finnish or international organization

Tomi Mäkelä ,

Finnish Medical Foundation, Member, Tomi Mäkelä, 01.01.1996 \rightarrow ... Head, Meilahti Transgenic Unit, Tomi Mäkelä, 2001 \rightarrow 2008 Director, Helsinki Biomedical Graduate School, Tomi Mäkelä, 2002 \rightarrow 2007 Finnish Academy of Science and Letters, Member, Tomi Mäkelä, 01.01.2002 \rightarrow 31.12.2011, Finland EMBO Member, Tomi Mäkelä, 16.02.2003 \rightarrow 31.12.2030, Finland Director (acting), Biomedicum Helsinki, Tomi Mäkelä, 11.2004 \rightarrow 11.2005


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Chairman of the Board, Finnish Medical Foundation, Tomi Mäkelä, 2005 \rightarrow 2010 Dean of Research, Faculty of Medicine, Tomi Mäkelä, 2007 \rightarrow 2009 Board Member, Biocenter Finland, Tomi Mäkelä, 01.01.2010 \rightarrow ...

Membership or other role of body in private company/organisation

Alan Schulman,

Member, Alan Schulman, 2001 \rightarrow 2005, Finland **Ruslan Kalendar**,

PrimerDigital, Ruslan Kalendar, 01.10.2006 $\rightarrow \dots$, Finland

Participation in interview for written media

Yrjö Helariutta ,

Helsingin Sanomat, Yrjö Helariutta, 16.12.2000 → 31.12.2011, Finland Helsingin Sanomat, Yrjö Helariutta, 20.10.2001 → 31.12.2011, United States

Tomi Mäkelä ,

Participation in several interviews/Helsingin Sanomat, Tomi Mäkelä, 1996 → 2010 Interview, Marita Räsänen, LÄÄKÄRIN AMMATTITAITO (book), Tomi Mäkelä, 15.06.2005 Science Days Finland 2005: "Oncogenes", Tomi Mäkelä, 14.01.2005 Science Days Finland 2005: professor on call, Tomi Mäkelä, 14.01.2005 Science Days Finland 2007: Opportunities from Cancer Biology, Tomi Mäkelä, 10.01.2007 Kiinnostus tutkijan työhön uhkaa hiipua, Tomi Mäkelä, 2009, Finland **Ilkka Hanski ,** Kauppalehti, Optio, Ilkka Hanski, 01.11.2003 → 31.12.2011, Finland

Kauppalenti, Optio, linka Hanski, 01.11.2003 – 31.12.2011, Finland YLE-Teema, likka Hanski, 14.12.2006, Germany HUB Bulletin interview article, Butterfly effects, likka Hanski, 01.01.2008, Madagascar Helsingin Sanomat monthly magazine, likka Hanski, 01.01.2008 – 31.12.2011, Madagascar

Participation in radio programme

Tomi Mäkelä ,

Radiaattori: Transkriptiosta Nobelin palkinto/Sisko Loikkanen, Tomi Mäkelä, 11.10.2006 Radiaattori: telomeraasista Nobel / Sisko Loikkanen, Tomi Mäkelä, 21.10.2010

Participation in TV programme

Petri Auvinen , Prisma studio (YLE1), Petri Auvinen, 2005 Ilkka Hanski ,

Prisma TV-ohjelma, Ilkka Hanski, 01.10.2005, United Kingdom

Participation in interview for web based media

Tomi Mäkelä ,

Tomi Mäkelä Helsingin biotekniikan instituutin johtoon, Tomi Mäkelä, 16.01.2009 Annual Centre of Excellence seminar: Peer review easier in life sciences, Tomi Mäkelä, 14.12.2010



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

Web of Science(WoS)-based bibliometrics of the RC's publications data 1.1.2005-31.12.2010 by CWTS, Leiden University, the Netherlands

Research Group: Helariutta Y

Basic statistics

Number of publications (P)	195
Number of citations (TCS)	2,851
Number of citations per publication (MCS)	14.73
Percentage of uncited publications	19%
Field-normalized number of citations per publication (MNCS)	3.09
Field-normalized average journal impact (MNJS)	1.56
Field-normalized proportion highly cited publications (top 10%)	1.78
Internal coverage	.85

Trend analyses









Performance (MNCS) by collaboration type



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Research profile



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