Self-Assessment Report
Faculty of Biology, University of Latvia

GENERAL INFORMATION

Institution	**University of Latvia**
Address	**Raiņa bulv. 19, Rīga, LV-1586**
Phone	**+371 67034301, +371 67034320**
Internet home page	**http://www.lu.lv**
Unit or equivalent (Department, Laboratory, Faculty, Institution)	**Faculty of Biology**
Address	**Kronvalda Blvd. 4, Rīga, LV-1586**
Phone	**+371 67034861**
Head of the Institution/Unit	**Dean Dr. biol. Nils Rostoks**
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G.1. Institution's/Unit's research profile

(give estimate percentage)

Research fields	(%)
Biochemistry	**2**
Biological didactics	**2**
Biometry and Bioinformatics	**5**
Biophysics	**2**
Botany	**8**
Biotechnology	**8**
Cell biology	**5**
Dendrochronology and Dendroecology	**4**
Ecology	**8**
Genetics	**7**
Hydrobiology	**4**
Immunology	**5**
Human and animal physiology	**8**
Microbiology	**8**
Molecular biology	**8**
Plant physiology	**6**
Virology	**2**
Zoology	**8**

G.2. Other relevant fields connected to the Institution's/Unit's research profile

(Mark with x the columns 1, 2 or 3, where 1=collaboration, 2=joint projects, 3=integrated in the group. More than one column can be marked in the same row.)

Research fields	1	2	3
Forestry		x	x
Medicine	x	x	x
Agriculture		x	
Earth Sciences	x	x	
Pedagogy		x	

1. RESOURCES

1.1. Staff in 2012 (person-months or FTE)

See instructions at the end of the report.

	2012
Academic personnel	***24.07***
Professors	**5.26**
Associated Professors	**5.01**
Docents	**7.81**
Lecturers	**4.99**
Assistants	**1**
Doctoral students (among the above)	

Academic research personnel	***27.41***
Leading researchers Researchers Research Assistants Doctoral students (among the above)	**5.75** **10.96** **10.70**
Other academic personnel	
Visiting Professors Visiting researchers and visiting research students	
Total active academic and research personnel	***51.48***
Administrative personnel [1)]	***2.84***
Technical personnel [2]	***5.35***
Total staff at the institution/unit	***59.67***

[1)] Includes all administrative personnel
[2)] Includes all technical personnel
[3)] Includes all personnel not included in the other categories in the table.

1.2. Academic and postdoctoral researchers (personnel with doctoral degree)

In case person's duties have changed during the period under review (e.g. from technical personnel to active academic or research staff), indicate the person's both tasks and period according to the format.

Name, Surname	**Position**	**Period of time**
Juris Imants Aivars	Professor, Head of Department Leading Researcher	1/2006 - 7/2010 -
Jānis Ancāns	Leading Researcher	1/2008 -
Una Andersone	Researcher	8/2008 -
Andris Andrušaitis	Associated Professor	1/2006 -
Ainārs Auniņš	Researcher Docent	3/2011 – 02/2012 – 06/2012
Maija Balode	Docent	7/2010 -
Valdis Ģirts Balodis	Associated Professor	09/2011 – 06/2012 09/2012 -
Viesturs Baumanis	Professor, Head of Department	7/2007 -
Rita Birziņa	Leading Researcher	7/2010 -
Guntis Brūmelis	Professor, Head of Department Leading Researcher	1/2006 - 7/2010 -
Inese Čakstiņa	Researcher	9/2011 -
Andris Čeirāns	Lecturer Leading Researcher	7/2006 - 7/2010 -
Iluta Dauškane	Researcher Lecturer	8/2011 – 02/2012 -
Ivars Druvietis	Docent Head of Department Leading Researcher	3/2010 - 7/2011 – 03/2012 -

Name, Surname	Position	Period of time
Didzis Elferts	Leading Researcher Docent	1/2011 - 9/2010 -
Dace Grauda	Docent	10/2011 – 06/2012 09/2012 -
Ģederts Ieviņš	Professor, Head of Department Leading Researcher	1/2006 - 7/2010 -
Uldis Kalnenieks	Professor	9/2011 -
Uldis Kondratovičs	Associated Professor Leading Researcher	1/2006 - 7/2010 -
Viesturs Ķerus	Researcher	10/2012 – 12/2012
Brigita Laime	Docent Researcher	9/2011 - 7/2010 -
Anita Lielpētere	Leading Researcher	03/2011 – 12/2012
Normunds Līcis	Docent Leading Researcher	7/2008 - 7/2010 -
Nataļja Matjuškova	Docent Leading Researcher	7/2008 - 7/2010 -
Dace Megre	Researcher	03/2012-12/2012
Pēteris Mekšs	Researcher	03/2011-12/2012
Anna Mežaka	Researcher	3/2011 -
Signe Mežinska	Research assistant Researcher	06/2011-06/2012 07/2012-12/2012
Indriķis Muižnieks	Professor, Head of Department Leading Researcher	1/2006 - 7/2010 -
Ilva Nakurte	Researcher	01/2011 – 12/2012
Vizma Nikolajeva	Docent Leading Researcher	7/2008 - 7/2010 -
Jevgenija Ņečajeva	Researcher Docent	10/2012 – 10/2012 -
Līga Ozoliņa-Molla	Associated Professor Leading Researcher	1/2006 - 7/2010 -
Līga Plakane	Docent Leading Researcher	7/2007 - 4/2007 -
Jānis Priednieks	Associated Professor, Head of Department Leading Researcher	1/2006 - 7/2010 -
Pauls Pumpēns	Professor	1/2006 -
Aivita Putniņa	Leading Researcher	03/2011 – 12/2012
Īzaks Rašals	Associated Professor	1/2006 -
Una Riekstiņa	Leading Researcher	02/2011 – 12/2012
Nils Rostoks	Leading Researcher Dean of Faculty	4/2007 - 7/2010 -
Ineta Samsone	Researcher	3/2010 -09/2012
Tūrs Selga	Docent	1/2006 –

Name, Surname	Position	Period of time
	Leading Researcher	07/2012 -
Agnija Skuja	Researcher	03/2012 – 12/2012
Eižens Slava	Docent	9/2009 -
Voldemārs Spuņģis	Associated Professor Leading Researcher	1/2006 - 7/2010 -
Māris Strazds	Researcher	3/2011 -
Guntis Tabors	Researcher Lecturer	3/2008 - 9/2009 -
Kaspars Tārs	Associated Professor	10/2011-06/2012 10/2012 -
Tatjana Tračevska	Leading Researcher	09/2011 – 12/2012
Pēteris Tretjakovs	Associated Professor	9/2008 -
Māra Vikmane	Docent Leading Researcher	1/2006 - 7/2010 -
Tatjana Zorenko	Associated Professor Leading Researcher	7/2007 - 7/2010 -
Egita Zviedre	Lecturer Researcher	11/2011 – 06/2012 09/2012 – 03/2012 – 12/2012

2. RESEARCH OUTPUT

2.1. Describe the Institution's/Unit's research

(max. 4 pages)

This question surveys how the research carried out in the Institution/Unit has impacted research in its own field(s). What are main fields and foci of research at the Institution/Unit? Has the Unit defined its strategic, long-term research plans – and if so, how does the Institution/Unit seek to realize those plans? How does the Institution/Unit develop and maintain structures and practices that foster good research and help early-career researchers to make their way into the profession? Is there a shared plan for publishing the research results, for employing research personnel and guiding the research of the Unit? Describe the orientation of scientific publishing, most important research results and the role of multidisciplinarity or interdisciplinarity etc. Also, describe the role of basic and applied research. In case the research carried out in the Unit is clearly specialised, describe each field separately (see also question 6.3).

N.B. *This part of the report is a minor update of the 2006 – 2011 report*

The Faculty of Biology, University of Latvia is the largest and the most diverse biology education institution in Latvia, providing education at bachelor, master and doctoral levels in all fields of modern biology. The primary function of the Faculty of Biology, University of Latvia (FB UL) is to provide higher education in biology; however, the Strategic Plan of the University of Latvia 2010 – 2020 sets forth integration of research and studies, and fosters research-based studies. Therefore, basic and applied research in all branches of contemporary biology is an essential task for the academic and research staff of the FB UL. Moreover, active involvement of the students in research projects is encouraged in all academic study programmes, and is essential for successful completion of bachelor, master and doctoral theses. Clearly, academic teaching staff of the FB is selected not only based on their scientific excellence in a particular field of biology, but rather on their ability to communicate modern biology to bachelor, master and doctoral level students. Thus, depending on

research interests of academic teaching and research staff some research areas are more advanced and with higher international recognition than others. Nevertheless, all academic staff are actively involved in research activities, which are considered essential along with their teaching skills. Academic research staff involved primarily in research projects used to be the minority of FB personnel; however, during the past years several large European Social Fund (ESF) and European Regional Development Fund (ERDF) projects have been carried out at the FB increasing the research staff considerably. Still, the research staff is also involved in teaching either directly in classes and laboratories or by supervising students' theses. During the past several years the number of PhD students at the FB has increased significantly, and importantly the number of defended PhD theses has shown concomitant increase. The graduates with PhD degree are mostly employed at the FBs as teaching and research staff, which allowed the faculty to refresh its academic staff and strengthen the research potential.

FB consists of seven departments representing major directions in biological science, and the research activities are usually carried out in the departments, although a significant number of interdisciplinary interdepartmental projects and activities are present as well. The main research activities of the research staff and PhD students at the departments are briefly described below, while the most significant scientific publications related to this research are listed in the sections 2.3. and 2.4. of the self-evaluation report, and the research projects, where the academic staff is involved, are listed in the section 7.

Department of Plant Physiology

Research at the Department of Plant Physiology focuses on physiological characterization of crop plants, plant stress response and hormonal regulation, as well as on plant introduction and breeding. Examples of the research carried out at the Department of Plant Physiology include physiological studies of barley, oat, potato and hemp under conventional and organic farming conditions (Ģ. Ieviņš, M. Vikmane, M. Maļceva), studies on seed dormancy (Ģ. Ieviņš, J. Ņečajeva), research on endangered plant species (Ģ. Ieviņš, B. Ieviņa, A. Gailīte), plant stress biology (Ģ. Ieviņš, I. Samsone, U. Andersone), as well as anatomical and physiological aspects of rhododendron introduction, breeding and propagation (U. Kondratovičs, D. Megre, K. Dokāne). The main sources of funding are Latvian Council of Science, as well as ESF through the support of PhD students. Significant national collaborations include the Botanical Garden of UL, and the Rhododendron Breeding station "Babīte", which also provides route for development and commercialization of new rhododendron varieties and improved propagation techniques. Studies of physiology of crop plants are usually carried out in collaboration with plant breeding institutes, while successful international collaboration has developed with University and Botanical Garden of Bremen (Germany), University of Helsinki (Finland), Millennium Seed Bank (UK) and Swedish Agricultural University (Sweden).

Department of Botany and Ecology

Research at the Department of Botany and Ecology focuses on diverse aspects of botany, ecology and conservation biology, in particular concentrating on ecology and management of forest and coastal ecosystems. The Department traditionally has a very strong emphasis on biometry and statistical analyses of biological data, providing support for other researchers at the FB. Examples of research carried out at the Department include study on conservation and management of coastal ecosystems (B. Laime), study on forest ecosystems and dendrochronology (G. Brūmelis, D. Elferts, R. Matisons), analysis of soil properties in various ecosystems (G. Tabors), and study of plant communities and populations (G. Brūmelis, A. Mežaka, L. Strazdiņa). Research funding comes through the Latvian Council of Science, through ESF funding for PhD students, and previously also through EU projects, such as LIFE/Nature. Significant national collaborations have been established with the Department of Zoology and Animal Ecology concentrating on studies of forest ecosystems, as well as with the Institute of Biology, University of Latvia, Latvian State Forest Research Institute "Silava, Daugavpils University and Forestry Faculty, Latvian University of Agriculture.

International collaborations include Swedish and Finnish universities concerning research in forest ecology. Networking collaboration has successfully led to joint doctoral courses and joint published papers.

Department of Hydrobiology

Research at the Department of Hydrobiology is related to various aspects of aquatic ecosystems, in particular focusing on Baltic Sea and Latvian inland waters. Examples of research carried out at the Department include identification of impact of toxic compounds of natural and anthropogenic origin in the Baltic Sea and lake ecosystems (M. Balode, I. Bārda, E., Strode, I. Putna, E. Seile), studies on lagoon lake biodiversity (A. Skuja, I. Konošonoka), eutrophication and harmful algal blooms (M. Balode, I. Bārda), toxic algae (M. Balode, I. Bārda), as well as monitoring and conservation measures for Latvian marine (M. Balode, I. Bārda, E. Strode, I. Putna) and inland waters (I. Druvietis, A. Skuja, I. Konošonoka). Research at the Department is funded through the Latvian Council of Science, a grant from ESF (in collaboration with the Institute of Aquatic Ecology) and, notably, through the EU Framework, BONUS, BSRP and LIFE programmes. The closest national collaborations have been developed with the Institute of Aquatic Ecology and the Institute of Biology, University of Latvia, with the Ministry of Environment and Regional Development, various governmental institutions and the "BIOR" (Institute of Food Safety, Animal Health and Environment).International collaborations include University of Klaipeda and University of Tartu in the Baltic countries, as well as other universities from the Baltic region – University of Rostock and University of Bremen (Germany), University of Gdansk (Poland), University of Stockholm (Sweden), University of Turku and SYKE (Finland) and student exchange with Rajamangala University of Technology Srivijaya (Thailand) for studies of mangrove ecosystems.

Department of Human and Animal Physiology

Research at the Department of Human and Animal Physiology focuses on a wide range of aspects of human physiology, often employing animal models for comparative studies. Examples of the research carried out at the Department include physiology of human vascular system (J.I. Aivars, Z. Marcinkēvičs), studies on sport physiology (L. Plakane, A. Paparde, D. Reihmane), as well as studies in physiology of adipose tissue and metabolism (L. Ozoliņa-Moll, J.I. Aivars, P. Tretjakovs, I. Bormane, I. Miķelsone). The research at the Department is primarily funded by the Latvian Council of Science and through the ESF support to PhD students. The research activities are also strongly linked to the Institute of Clinical and Experimental Medicine, University of Latvia. Other important national collaborations include the Institute of Cardiology, University of Latvia, Faculty of Veterinary Medicine, Latvian Agricultural University, while international collaborations include Umea University (Sweden).

Department of Microbiology and Biotechnology

Research at the Department of Microbiology and Biotechnology includes a wide array of topics, from studies on microbial diversity in environment to stem cell biology and plant biotechnology. Molecular tools are extensively used in research to study diversity at the DNA level using molecular marker systems, to assess changes in gene expression or to study rearrangements in genome structure. Examples of the research carried out at the Department of Microbiology and Biotechnology includes development and analysis of human autologous stem cells (J. Ancāns, Anna Ramata-Stunda, I. Čakstiņa), biology and biotechnology of the shitake mushroom (*Lentinula edodes*) (N. Matjuškova, E. Svilpe), analysis of diversity of microorganisms in forest and agricultural soils (V. Nikolajeva, L. Grantiņa), study of plant hypersensitive response and cell death using transgenic and DNA microarray approach (N. Rostoks, A. Keiša, L. Kāle), analysis of fungal glycoproteins for their immunomodulating properties (I. Muižnieks, V. Nikolajeva, A. Ramata – Stunda). Currently, the research at the Department is funded through grants from Latvian Council of Science, and grants from ESF and ERDF, with additional funding to PhD students provided by ESF. The Department has a strong interest in biosafety and bioethics research, which currently is funded through the ESF. Majority of research is interdisciplinary, involving colleagues from the

Institute of Microbiology and Biotechnology, Faculty of Medicine and Faculty of Chemistry of the UL, and university hospitals and research institutions in Latvia. Department traditionally has tight collaborations with research groups in Germany (University of Cologne, University of Erlangen), but recently good collaborations have been established with the James Hutton Institute (Scotland, UK), and with University of Helsinki (Finland) and University of Tartu that have already resulted in joint publications and PhD projects.

Department of Molecular Biology

Research at the Department of Molecular Biology is focused primarily on biomedicine, human genetics, and biotechnology of recombinant protein production for basic and applied research. The research and educational work is carried out in close collaboration with the Latvian Biomedical Research and Study Centre under umbrella of the International Biomedical and Biotechnology Centre at the Faculty of Biology. Latvian Biomedical Research and Study Centre is the largest research institution employing the FB graduates, and it is also an excellent research partner in terms of providing training site for FB students and genotyping and DNA sequencing services. Examples of the research carried out by the Department include studies on protein structure and engineering (P. Pumpēns, K. Tārs, A. Kazāks), as well as the studies on molecular genetics of viral and bacterial diseases, including molecular epidemiology of hepatitis, tuberculosis and tick-born diseases (V. Baumanis, R. Ranka). Laboratory of Plant Cell Biology (T. Selga) at the Department of Molecular Biology studies 3D structure and changes during developmental ageing and stress of photosynthesizing tissues of plants cells. There is also a strong focus on genetics, molecular biology and biotechnology of crop plants concentrating on genetic diversity, linkage mapping and production of doubled haploid plants (I. Rašals, D. Grauda). Recently, one barley (*Hordeum vulgare* L.) and one wheat (*Triticum aestivum* L.) doubled haploid varieties were released. Research funding is provided primarily through the ESF support for PhD students and collaboration with the Latvian Biomedical Research and Study Centre, while the crop genetics group is funded by the Latvian Council of Science. Other national collaborations include Department of Microbiology and Biotechnology, Institute of Microbiology and Biotechnology, University of Latvia, Rīga Stradins University, Latvian University of Agriculture and Latvian plant breeding institutes, while among international collaborations Humboldt University (Germany), Uppsala University and Karolinska University (Sweden), Danish Serum Institute (Denmark) and Tartu University (Estonia) should be highlighted.

Department of Zoology and Animal Ecology

Research at the Department of Zoology and Animal Ecology focuses on diverse aspects of biology, ecology and conservation biology of the Latvian fauna. Examples of the research carried out at the Department is long term monitoring and ecological study of the impact of agricultural practices on Latvian birdlife (J. Priednieks, A. Auniņš), biology and ecology of Latvian entomofauna (V. Spuņģis, A. Skuja, K. Vilks), studies on animal behavior (T. Zorenko), monitoring of animal migration (J. Priednieks, A. Čeirāns). The research at the Department is funded partly through grants from Latvian Council of Science, and ESF funding for PhD students, but significant part of research funding comes through collaborations with other research institutions, and governmental and non-governmental organizations for monitoring and conservation biology studies. Department traditionally has tight collaborations with the Museum of Zoology of UL, Department of Botany and Ecology and Department of Hidrobiology, and the Faculty of Geography and Earth Sciences. On national level good collaborations have been developed with Natural History Museum of Latvia, Faculty of Mathematics and Natural Sciences of the Daugavpils University, Forestry Institute "Silava", Ministry of Environment and Regional Development, as well as with non-governmental organizations Latvian Fund for Nature, Latvian Ornithological Society and Latvian Entomological Society.

Other structural units

Laboratory of Bioanalytical and Biodosimetry Methods was established in 2005 and its principal activity, currently, is to provide facilities for the ESF funded project on interdisciplinary biosafety research. The research concentrates on biosafety of stem cells (J. Ancāns, U. Riekstiņa, I. Čakstiņa, V. Parfejevs, M. Borodušķis, K. Rozenbergs, L. Cappiello, J. Kungs), genetically modified organisms (N. Rostoks, A. Keiša, L. Grantiņa) and antimicrobial agents (T. Tračevska, I. Līduma, U. Bērs), while social and legal aspects of the biosafety research are covered by collaborating scientists from the **Centre of Bioethics and Biosafety**, Faculty of Biology (A. Putniņa, S. Olsena, S. Mežinska, J. Kalēja, Z. Linde).

2.2. Number of scientific publications and other outputs 2012

N.B. *Only Web of Science and Scopus articles were counted for 2012 -2013*

	2012
1. Original articles in anonymously refereed scientific journals cited in *Thomson Reuters Web of Science*, SCOPUS, ERIH or Engineering Village	54 (WoS), 58 (Scopus)
2. Articles in other refereed scientific edited journals and conference proceedings	Not counted
3. Monographs published [1)]	12 doctoral theses
4. Other scientific publications [2)]	Not counted
5. Text books and other research-related publications	Not counted
6. Patents/ including international	3
7. Computer programs and algorithms [3)]	Not applicable
8. Registered cultivars	Not counted
9. Conference abstracts	Not counted
10. Visiting lectures	3
11. Articles, radio and television programmes and journals popularising science	Not counted
12. Other [4)]	Not counted

[1)] Includes doctoral theses and monographs
[2)] Includes edited proceedings, collections and special issues of scientific journals, and unrefereed scientific articles, excluding conference abstracts
[3)] Approximates the number of programs and algorithms that have been in use outside the unit.
[4)] May include design products, prototypes, artefacts, exhibitions, performances etc. Please specify.

2.3. Lists of most important publications by academic personnel and researchers with doctoral degree

(max 7 publications/person)

Each academic staff member and researcher will list 7 of his/her key publications during the period under review, preferably indicated in the order of quality. The list may also include manuscripts published in 2012 or manuscripts approved for publication but still unpublished. References to books should include names of editors, place of publication, and year.

Dr. h. biol. Juris Aivars, Professor, Leading Researcher

1. Tretjakovs P., Bormane I., Mackavics V., Mikelsone I., Balode L., Reihmane D., Stukena I., Bahs G., Aivars J.I., Pirags V.: Relation of inflammatory chemokines to insulin resistance and hypoadiponectinemia in coronary artery disease patients, European Journal of Internal Medicine 20, pp. 712-719, 2009.
2. Tretjakovs P., Aivars J.I., Jurka A., Bormane I., Pirags V.: Endothelin-1 TNF-alpha and vasomotor dysfunction in metabolic syndrome patients with insuline resistance, Journal of Clinical Lipidology 2(55), pp. 102-103, 2008.
3. Tretjakovs P., Jurka A., Štifts A., Aivars J., Jansone A., Pīrāgs V.: The effect of serotonin 5-HT2 receptor inhibitior on vasomotor responses, Vascular Disease Prevention 3(4), pp. 297-304, 2006.
4. Paturskis J., Veliks V., Svikis I., Uljanovs A., Cepurite L., Aivars J., Spigulis J.: Changes of frog (Rana Temporaria) vasomotor parameters under aplication of static magnetic field, 9th World Congress for Microcirculation Medimond International Proceedings, pp. 53-58, 2010.
5. Tretjakovs P., Jurka A., Bormane I., Miķelsone I., Reihmane D., Balode L., Jaunalksne I., Mackēvičs V., Suķēna I., Bahs G., Lejnieks A., Aivars J.I., Pīrāgs V.: Relation of endothelial dysfunction and adipokine levels to insulin resistance an metabolic syndrome patients, Proceedings of the Latvian Academy of Science 63(4/5), pp. 222-227, 2009.
6. Marcinkevics Z., Aivars J., Greve M.: Use of conventional and PPT-derived pressure measurement methods during static exercise, Medicina Sportiva Bohemica&Slovaca 16(3), pp. 90-91, 2007.
7. Plakane L., Aivars J., Skutela A., Vaļēviča E., Grēve M., Marcinkevičs Z.: Oxygen uptake efficiency in endurance-trained humans during acute hypoxia, Proceedings of the Latvian Academy of Science 60(5/6), pp. 170-175, 2006.

Dr. biol. Jānis Ancāns, Leading Researcher

1. Ichim TE, Minev B., Braciak T., Luna B., Hunninghake R., Mikirova N.A., Jackson J.A., Gonzalez M.J., Miranda-Massari J.R., Alexandrescu D.T., Dasanu C.A., Bogin V., Ancans J., Stevens R.B., Markosian B., Koropatnick J., Chen C.S., Riordan N.H.: Intravenous ascorbic acid to prevent and treat cancer-associated sepsis? Journal of Translational Medicine 9, pp. 25, 2011.
2. Committee for Advanced Therapies (CAT), Salmikangas P., Jilma B., Flamion B., Todorova L.R., Paphitou A., Haunerova I., Maimets T., Trouvin J.H., Flory E., Tsiftsoglou A., Sarkadi B., Gudmundsson K., O'Donovan M., Migliaccio G., Ancāns J., Maciulaitis R., Robert J.L., Samuel A., Ovelgönne J.H., Hystad M., Fal A.M., Lima B.S., Moraru A.S., Turc?ni P., Zorec R., Ruiz S., Akerblom L., Narayanan G., Kent A., Bignami F., Dickson J.G., Niederwieser D., Figuerola-Santos M.A., Reischl I.G., Beuneu C., Georgiev R., Vassiliou M., Pychova A., Clausen M., Methuen T., Lucas S., Schüssler-Lenz M., Kokkas V., Buz?s Z., MacAleenan N., Galli M.C., Linē A., Gulbinovic J., Berchem G., Fraczek M., Menezes-Ferreira M., Vilceanu N., Hrubisko M., Marinko P., Timón M., Cheng W., Crosbie G.A., Meade N., di Paola M.L., VandenDriessche T., Ljungman P., D'Apote L., Oliver-Diaz O., Büttel I., Celis P.: Challenges with advanced therapy medicinal products and how to meet them, Nature reviews. Drug discovery. 9(3), pp. 195, 2010.
3. Committee for Advanced Therapies (CAT), incl. Ancans J.: Use of unregulated stem-cell based medicinal products, The Lancet 376(9740), pp. 514, 2010.

4. Riekstina U, Cakstina I., Parfejevs V., Hoogduijn M., Jankovskis G., Muiznieks I., Muceniece R., Ancans J.: Embryonic stem cell marker expression pattern in human mesenchymal stem cells derived from bone marrow, adipose tissue, heart and dermis, Stem Cell Reviews 5(4), pp. 378, 2009.
5. Riekstina U., Cakstina I, Muceniece R, Jankovskis G, Ancans J.: Isolation, cultivation and characterization of human somatic stem cells from adult skin, adipose tissue and bone marrow, Cell Research 18, pp. s161, 2008.
6. Ancans, J.: Cell therapy medicinal product regulatory framework in Europe and its application for MSC-based therapy development. *Frontiers in Immunology*, 3, 2012.
7. Muceniece R, Saleniece K., Riekstina U., Krigere L., Tirzitis G., Ancans J.: Betulin binds to melanocortin receptors and antagonizes alpha-melanocyte stimulating hormone induced cAMP generation in mouse melanoma cells, Cell Biochemistry and Function 25, pp. 591, 2007.

Dr. biol. Una Andersone, Researcher

1. Andersone U., Druva-Lūsīte I., Ieviņa B., Karlsons A., Ņečajeva J., Samsone I., Ievinsh G.: The use of nondestructive methods to assess a physiological status and conservation perspectives of Eryngium maritimum L., Journal of Coastal Conservation 15(4), pp. 509-522, 2011.
2. Andersone U., Samsone I., Ievinsh G.: Neodiprion sertifer defoliation causes long-term systemic changes of oxidative enzyme activities in Scots pine needles, Arthropod-Plant Interactions 3, pp. 209-214, 2009.
3. Samsone I., Andersone U., Ievinsh G.: Gall midge Rhabdophaga rosaria-induced rosette galls on Salix: morphology, photochemistry of photosynthesis and defense enzyme activity, Environmental and Experimental Biology 9, pp. 29-36, 2011.
4. Samsone I., Druva-Lūsīte I., Andersone U., Nečajeva J., Karlsons A., Ievinsh G.: Plasticity of a dune plant Alyssum gmelinii in response to sand burial in natural conditions, Acta Universitatis Latviensis 763, pp. 125-136, 2009.
5. Andersone U., Ievinsh G.: Medium pH affects regeneration capacity and oxidative enzyme activity of Pinus sylvestris in tissue culture, Acta Universitatis Latviensis 745, pp. 25-35, 2008.
6. Samsone I., Andersone U., Vikmane M., Ievina B., Pakarna G., Ievinsh G.: Nondestructive methods in plant biology: an accurate measurement of chlorophyll content by a chlorophyll meter, Acta Universitatis Latviensis 723, pp. 145-154, 2007.

Dr. biol. Andris Andrušaitis, Associated Professor, Leading Researcher

1. Kļaviņš M., A.Andrusaitis (eds), Blumberga D., Bruņiniece I., Briede, A., Grišule, G., Āboliņa K.: Climate change and global warming (Klimata mainība un globālā sasilšana) Kļaviņš M. and A. Andrusaitis (eds), LU Akadēmiskais apgāds, Riga, 2008.

Dr. biol. Ainārs Auniņš, Researcher

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2. Freivalds J., Dislers A., Ose V., Pumpens P., Tars K., Kazaks A.: Highly efficient production of phosphorylated hepatitis B core particles in yeast *Pichia pastoris*, Protein Expression and Purification 75(2), pp. 218-224, 2011.
3. Tars K., Rumnieks J, Zeltins A, Kazaks A, Kotelovica S, Leonciks A, Sharipo J, Viksna A, Kuka J, Liepinsh E, Dambrova M.: Crystal structure of human gamma-butyrobetaine hydroxylase, Biochemical and Biophysical Research Communications 398(4), pp. 636-639, 2010.
4. Brangulis, K., Tars, K., Petrovskis, I., Kazaks, A., Ranka, R. & Baumanis, V.: Crystal structure of an outer surface protein BBA64 from Borrelia burgdorferi in comparison to BbCRASP-1. Febs Journal 279, 467-467, 2012.
5. Kazaks, A., Dislers, A., Lipowsky, G., Nikolajeva, V. & Tars, K.: Complete Genome Sequence of the Enterobacter cancerogenus Bacteriophage Enc34. Journal of Virology 86, 11403-11404, 2012.
6. Rumnieks, J. & Tars, K.: Diversity of pili-specific bacteriophages: genome sequence of IncM plasmid-dependent RNA phage M. BMC Microbiology 12, 2012.

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7. Tars, K., Kotelovica, S., Lipowsky, G., Bauer, M., Beerli, R. R., Bachmann, M. F. & Maurer, P.: Different Binding Modes of Free and Carrier-Protein-Coupled Nicotine in a Human Monoclonal Antibody. Journal of Molecular Biology 415, 118-127, 2012.

Dr. biol. Pēteris Tretjakovs, Associated Professor, Leading Researcher

1. Tretjakovs P., Bormane I., Mackavics V., Mikelsone I., Balode L., Reihmane D., Stukena I., Bahs G., Aivars J.I., Pirags V.: Relation of inflammatory chemokines to insulin resistance and hypoadiponectinemia in coronary artery disease patients, European Journal of Internal Medicine 20, pp. 712-719, 2009.
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3. Tretjakovs, P., Jurka, A., Bormane, I., Mikelsone, I., Reihmane, D., Elksne, K., Krievina, G., Verbovenko, J. & Bahs, G.: Relationship of neopterin to increased vascular cell adhesion molecule-1 and myeloperoxidase levels in unstable angina. Cardiovascular Research 93, S61-S61, 2012.
4. Reihmane, D., Jurka, A. & Tretjakovs, P.: The Relationship Between Maximal Exercise-Induced Increases in Serum IL-6, MPO and MMP-9 Concentrations. Scandinavian Journal of Immunology 76, 188-192, 2012.
5. Miķelsone I., Bormane I., Simsone Z., Jurka A, Tretjakovs P.: The effect of chronic cigarette smoking on microvascular function, insulin resistance and inflammatory state, Environmental and Experimental Biology 9, pp. 23-28, 2011.
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7. Jurka A., Tretjakovs P., Bormane I., Reihmane D., Mikelsone I., Jirgensons J., Bahs G., Martinsons A.: Increased TNF-alpha levels and vasomotor dysfunction in hypertensive patients with insulin resistance, Current Advances in Heart Disease, MEDIMOND International Proceedings, pp. 219-223, 2008.

Dr. biol. Māra Vikmane, Docent, Leading Researcher

1. Maļceva M., Stramkale V., Vikmane M.: Physiological aspects of nitrogen fertilizer impact on Latvian origin *Cannabis sativa* L., Environment. Technology. Resources. Proceedings of the 8th International Scientific and Practical Conference 11, pp. 305-314, 2011.
2. Maļceva M., Vikmane M., Stramkale V.: Changes of photosynthesis-related parameters and productivity of Cannabis sativa under different nitrogen supply, Environmental and Experimental Biology 9, pp. 61-69, 2011.
3. Maļceva M., Vikmane M., Stramkale V., Stramkalis A.: Slāpekļa mēslojuma izmantošanas efektivitāte galviņkāpostiem, Environment. Technology. Resources. Proceedings of the 7th International Scientific and Practical Conference, pp. 125-132, 2009.
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5. Stramkale V., Vikmane M., Zeļonka L.: The physiological aspects of the wheat yield obtained from seeds treated with phosphorus, Latvian Journal of Agronomy (11), pp. 287-293, 2008.
6. Samsone I., Andersone U., Vikmane M., Ievina B., Pakarna G., Ievinsh G.: Nondestructive methods in plant biology: an accurate measurement of chlorophyll content by a chlorophyll meter, Acta Universitatis Latviensis 723, pp. 145-154, 2007.

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7. Stramkale V., Stramkalis A., Pakarna G., Vikmane M.: Physiological aspects of wheat yield quality in dependence on mineral supply through leaves, Environment. Technology. Resources, Proceedings of the 6th International Scientific and Practical Conference, pp. 195-200, 2007.

Dr. h. biol. Tatjana Zorenko, Associated Professor, Leading Researcher

1. Kryštufek B., Zorenko T., Buzan E.: New insights into taxonomy and phylogeny of social voles inferred from mitochondrial cytochrome b sequences, Mammalian Biology, in press.2011.
2. Dambrova M., Cirule H., Shvalbe B., Zvejniece L., Pugovichs O., ZorenkoT., Liepinsh E., Belozertseva I. : Effect of inhibiting carnitine biosynthesis on male rat sexual performance, Physiology & Behavior 95, pp. 341-347, 2008.
3. Социальное поведение и звуковая сигнализация дальневосточных полевок *Microtus fortis* (Rodentia, Arvicolinae) (Social beahaviour and sound signals of voles *Microtus fortis*), Зоол. журн. (Zoological journal) 85(6), pp. 1-9, 2006.
4. Kryštufek, B., Zorenko, T. & Buzan, E. V.: New insights into the taxonomy and phylogeny of social voles inferred from mitochondrial cytochrome b sequences. Mammalian Biology 77, 178-182, 2012.
5. Zorenko T.: Latvijas zīdītāju noteicējs (Key-book of Latvian mammals), Gandrs, Rīga, 2008.

Dr. biol. Egita Zviedra, lecturer, researcher

Zviedre E., Grīnberga L.: New species of Charophyta Chara polyacantha A. Braun, in Lake Engure, Latvia. Biodiversity: Research and Conservation, vol. 25, Issue 1, 43-45, 2012.
Grinberga L., Zviedre E.: Engures ezera sateces baseina mazo ezeru floristiski ekoloģiskais raksturojums. Latvijas veģetācija, sēj. 23, 153-164, 2012.

2.4. Copies of the Institution's/Unit's best publications

(Append copies of publications, maximum number of publications = number of professors/researchers in the Institution/Unit, but a minimum of five publications)

The copies of relevant publications should be scanned and added as separate files together with the self-assessment report file or as printed copies submitted to the Ministry of Education and Science. For ensuring easy readability do not make the font size smaller when copying publications. The copies of publications shall be two-sided. For monograph and book copy the title page and content.

N.B. *Please, see the files "_LU_BF_publications_2012_2013_01.pdf" and "_LU_BF_publications_2012_2013_02.pdf" for 22 publications involving teachers and researchers of the Faculty of Biology, University of Latvia. Only papers published in 2012 – 2013 are included.*

1. Ancans, J. (2012). Cell therapy medicinal product regulatory framework in Europe and its application for MSC-based therapy development. *Frontiers in Immunology* 3.
2. Casini, M., Blenckner, T., Möllmann, C., Gårdmark, A., Lindegren, M., Llope, M., Kornilovs, G., Plikshs, M. & Stenseth, N. C. (2012). Predator transitory spillover induces trophic cascades in ecological sinks. *Proceedings of the National Academy of Sciences of the United States of America* 109, 8185-8189.
3. Grabovskis, A., Marcinkevics, Z., Rubins, U. & Kviesis-Kipge, E. (2013). Effect of probe contact pressure on the photoplethysmographic assessment of conduit artery stiffness. *Journal of Biomedical Optics* 18.
4. Grantina, L., Bondare, G., Janberga, A., Tabors, G., Kasparinskis, R., Nikolajeva, V. & Muiznieks, I. (2012). Monitoring seasonal changes in microbial populations of spruce forest soil of the Northern Temperate Zone. *Estonian Journal of Ecology* 61, 190-214.
5. Grantina-Ievina, L., Andersone, U., Berkolde-Pīre, D., Nikolajeva, V. & Ievinsh, G. (2013). Critical tests for determination of microbiological quality and biological activity in

commercial vermicompost samples of different origins. *Applied Microbiology and Biotechnology*, 1-14.

6. Ikauniece, S., Brumelis, G. & Zarins, J. (2012). Linking woodland key habitat inventory and forest inventory data to prioritize districts needing conservation efforts. *Ecological Indicators* 14, 18-26.
7. Ikauniece, S., Brumelis, G., Kasparinskis, R., Nikodemus, O., Straupe, I. & Zariņš, J. (2013). Effect of soil and canopy factors on vegetation of *Quercus robur* woodland in the boreo-nemoral zone: A plant-trait based approach. *Forest Ecology and Management* 295, 43-50.
8. Kazaks, A., Dislers, A., Lipowsky, G., Nikolajeva, V. & Tars, K. (2012). Complete genome sequence of the *Enterobacter cancerogenus* bacteriophage Enc34. *Journal of Virology* 86, 11403-11404.
9. Keisa, A., Nakurte, I., Kunga, L., Kale, L. & Rostoks, N. (2013). Increased auxin content and altered auxin response in barley necrotic mutant *nec1*. In *Advance in Barley Sciences* (Zhang, G., Li, C. & Liu, X., eds.), pp. 229-241. Springer Netherlands.
10. Madžule, L., Brumelis, G. & Tjarve, D. (2012). Structures determining bryophyte species richness in a managed forest landscape in boreo-nemoral Europe. *Biodiversity and Conservation* 21, 437-450.
11. Matisons, R., Elferts, D. & Brumelis, G. (2012). Changes in climatic signals of English oak tree-ring width and cross-section area of earlywood vessels in Latvia during the period 1900-2009. *Forest Ecology and Management* 279, 34-44.
12. Mezaka, I., Legzdina, L., Waugh, R., Close, T. & Rostoks, N. (2013). Genetic diversity in Latvian spring barley association mapping population. In *Advance in Barley Sciences* (Zhang, G., Li, C. & Liu, X., eds.), pp. 25-35. Springer Netherlands.
13. Opermanis, O., MacSharry, B., Aunins, A. & Sipkova, Z. (2012). Connectedness and connectivity of the Natura 2000 network of protected areas across country borders in the European Union. *Biological Conservation* 153, 227-238.
14. Ranka, R., Petrovskis, I., Sominskaya, I., Bogans, J., Bruvere, R., Akopjana, I., Ose, V., Timofejeva, I., Brangulis, K., Pumpens, P. & Baumanis, V. (2013). Fibronectin-binding nanoparticles for intracellular targeting addressed by *B. burgdorferi* BBK32 protein fragments. *Nanomedicine: Nanotechnology, Biology, and Medicine* 9, 65-73.
15. Reihmane, D., Jurka, A. & Tretjakovs, P. (2012). The relationship between maximal exercise-induced increases in serum IL-6, MPO and MMP-9 concentrations. *Scandinavian Journal of Immunology* 76, 188-192.
16. Roseman, A. M., Borschukova, O., Berriman, J. A., Wynne, S. A., Pumpens, P. & Crowther, R. A. (2012). Structures of hepatitis b virus cores presenting a model epitope and their complexes with antibodies. *Journal of Molecular Biology* 423, 63-78.
17. Rumnieks, J. & Tars, K. (2012). Diversity of pili-specific bacteriophages: Genome sequence of IncM plasmid-dependent RNA phage M. *BMC Microbiology*, 277.
18. Salmane-Kulikovska, I. & Mezinska, S. (2013). 'I had to help my child!': The role of emotions, risk, and trust in use of nasal decongestants in children. *Journal of Child Health Care* 17, 41-52.
19. Strazdina, I., Kravale, Z., Galinina, N., Rutkis, R., Poole, R. K. & Kalnenieks, U. (2012). Electron transport and oxidative stress in *Zymomonas mobilis* respiratory mutants. *Archives of Microbiology* 194, 461-471.
20. Strode E., Berezina N., Kalnins M., Balode M. (2013). New records of the amphipods *Gammarus tigrinus* Sexton, 1039 and *Pontagammarus robustoides* G. O. Sars, 1894 in Latvian waters of the Baltic Sea. *Bioinvasions Records* 2(1): 63-68.
21. Tars, K., Kotelovica, S., Lipowsky, G., Bauer, M., Beerli, R. R., Bachmann, M. F. & Maurer, P. (2012). Different binding modes of free and carrier-protein-coupled nicotine in a human monoclonal antibody. *Journal of Molecular Biology* 415, 118-127.

22. Zablotskaya, A., Segal, I., Popelis, Y., Grinberga, S., Shestakova, I., Nikolajeva, V. & Eze, D. (2013). Silyl modification of biologically active compounds. 13. Synthesis, cytotoxicity and antibacterial action of N-methyl-N-(2-triorganylsiloxyethyl)-1, 2,3,4-tetrahydro(iso)quinolinium iodides. *Applied Organometallic Chemistry* 27, 114-124.

3. DOCTORAL TRAINING

3.1. Number of students in 2012

Give the number of completed Master degrees and their ratio among those enrolled in the doctoral training.

	2012
Completed their Master degree[1)]	51
Enrolled in doctoral studies[2)]	13

[1)] Master students are enrolled at the host universities and complete their degree there. Institution's/Unit's personnel is also involved in supervising Master's theses. Research institutes indicate Master students, if at least half of the Master thesis has been performed at research institute during 2012 under the guidance of the research stuff of the institute.
[2)] Doctoral students enrolled at the university/ or a number of PhD students who have been working at Institution/Unit during 2012 under the guidance of the researcher of the Institution/Unit, their FTE performing research work being almost 50 percent of the total.

3.2. List of doctoral dissertations in 2012 and present employment

If at least half of the doctoral dissertation has been supervised and/or done at a research institute, the research institute can also list the doctoral dissertation as its own outcome. In this case indicate also the university (in year of completion) where the doctoral dissertation has been presented for approval. In present employment, indicate the type of organisation (university, business company, research institute, state, municipality or other).

Name (given name and family name)	**Topic of dissertation**	**Year of completing the degree**	**Present employment (job description, organisation)**
Jurgensone Iveta	The structural variation of phytoplankton in the Gulf of Riga under the influence of environmental factors	2011, LU BF *(defended in late 2011, not included in 2006 – 2011 report)*	Latvian Institute of Aquatic ecology
Kalniņš Mārtiņš	The dragonflies (odonata) species composition changes, spatial distribution and their determining factors in Latvia.	2012, LU BF	Sigulda Nature Conservation Agency
Ņečajeva Jevgenija	Germination ecophysiology of coastal plants: seed dormancy and the effect of environmental factors	2012, LU BF	LU Faculty of Biology
Ķerus Viesturs	Changes in the status of breeding birds of Latvia during 1980-2010	2012, LU BF	Latvian Ornithological Society
Karlsons	Adaptive mechanisms of mineral	2012, LU BF	Institute of Biology UL

Andis	nutrition and characteristics of mineral supply for sea-coast plants		
Bormane Inga	Serum concentrations of cytokines and adhesion molecules as markers of degree of endothelial dysfunction	2012, LU BF	Institute of Experimental and Clinical Medicine UL
Ignatoviča Vita	Functionality and genetics of melanocortin and purinergic receptors	2012, LU BF	Latvian Biomedical Research and study centre
Zajakins Pāvels	Development of approach for exploration of autoantibody profiles in cancer patients and identification of autoantibody	2012, LU BF	Latvian Biomedical Research and study centre
Dimante-Deimantoviča Inta	Characterization of the faunistic and spatial structure of the pelagic zooplankton in the Latvian deep lakes	2012, LU BF	Institute of Ecology University of Daugavpils; Norwegian Institute for Nature Research
Gailīte Agnese	Physiological and genetic aspects of Estonian saw-wort (*Saussurea esthonica)* conservation	2012, LU BF	Latvian State Forest Research Institute Silava
Reihmane Dace	Acute impact of exercise on pro-inflammatory molecule concentrations in blood: factors that affect exercise induced response	2013, LU BF	Riga Stradins University
Keiša Anete	Regulation of hypersensitive response in barley	2013, LU BF	Faculty of Biology, UL

4. NATIONAL AND INTERNATIONAL COLLABORATION

4.1. National collaboration

List the national collaboration partners of the Unit. Collaborator refers to a person or a research team with whom the cooperation has either generated or is expected to generate within the next three years one of the outcomes indicated in item 2.2. Types of collaboration include e.g. joint projects, researcher mobility. In "Field of science", give the main field of the collaborator (physics, chemistry, mechanical engineering etc.)

Organisation	**Type of collaboration**	**Field of science**
Universities		
Latvian University of Agriculture	Joint projects	Biology, agricultural sciences
Daugavpils University	Joint projects, publications	Biology, ecology
Daugavpils University	Joint project	New fluorescent materials
Institute of Stomatology, Riga Stradina University	Joint projects, publications	Medicine
Cell Transplantation Center, Pauls Stradin's Clinical University hospital	Joint projects, publications	Medicine
Latvian University of Agriculture, Biosystems group	Joint project	Systems biology

Riga Technical University, Heat, Gas and Water technology institute	Joint project	Biotechnology of biofuels
Rīga Stradiņš University	Joint projects, publications	Biology, physiology
Other higher educational establishments, graduate schools, colleges		
Riga Teacher Training and Educational Management Academy	Projects, publications	Human physiology
Public research institutes		
Latvian Biomedical Research and Study Centre	Projects, publications	Biology
Institute of Biology, University of Latvia	Projects, publications	Biology
Institute of Microbiology and Biotechnology, University of Latvia	Projects, publications	Biology
State Priekuli Plant Breeding Institute	Projects, publications	Agricultural science
State Stende Cereal Breeding Institute	Projects, publications	Agricultural science
Latvia State Institute of Fruit-Growing	Projects, publications	Agricultural science
Latvian State Forest Research Institute "Silava"	Projects, publications	Biology
Biomedical Research and Study Centre	Joint project	Medicine
Institute of Hydroecology	Joint projects, publications	Hydrobiology
Institute of Cardiology , University of Latvia	Projects, publications	Human physiology
Institute of Experimental and Clinical Medicine, University of Latvia	Projects, publications	Human physiology
Enterprises		
SIA "Madara Cosmetics"	Projects	Development of test system for testing cosmetics
SIA "Bioefekts"	Contract research	Microbiological plant protection agents
Other		
National conferences, workshops and seminars organised by the institution/unit		
Annual scientific conference of the University of Latvia, section Biology, subsections Plant Science, Plant Introduction an Selection, Molecular Biology and Genetics, Microbiology and Biotechnology, Human and Animal Physiology, Botany and Ecology, Dendroecology, Vertebrate Zoology, Invertebrate Zoology, Biosafety, Latvia's water environment investigations and protection.		
Meetings of professional organisations, such as Latvian Society for Microbiology and Biology, Latvian Society for Cell Biology, Latvian Society for Genetics and Breeding, Latvian Botanical Society		

4.2. Visits abroad (minimum duration of visit: one month) in 2012

List the visits per year. List the visits of each year by country in the alphabetical order. In item "Purpose of the visit" indicate clearly the objective of the visit.

Name	Target organisation	Country	Purpose of the visit	Duration in months
Prof. I.	University of	Germany	Adenoviral	3

Muižnieks	Erlangen		research	
Prof. U. Kalnenieks	University of Sheffield	UK	*Zymomonas mobilis* as bioethanol producer	1
Dr. I. Čakstiņa	University of Erlangen, University of Regensburg	Germany	Cell biology research	1
PhD student Līga Kāle	University of Helsinki	Finland	Plant Science research	3
Master student. Janis Kimsis	Tronheim University	Norway	Cell biology research	6
Master student Adrija Kalvisa	Aarhus University	Denmark	Cell biology research	6
Dr.Anna Mežaka	University of SanktPeterburg	Russia	Plant ecology research	5

4.3. Visits to the Unit (minimum duration of visit: one month) in 2012

List the visits per year. List the visits of each year by country in the alphabetical order. In item "Purpose of the visit" indicate clearly the objective of the visit.

Name of visitor	Home organisation	Country	Purpose of the visit	Duration in months

4.4. Most important foreign collaborators

List the most important foreign collaborators, as defined in item 4.1.

Name and Organisation	Type of collaboration	Country
Universities		
Washington State University	Joint publications, exchange of barley mutant stocks	USA
University of Helsinki	Joint PhD project	Finland
Department of Forest Sciences, University of Helsinki	Forest ecology researcher network	Finland
Department of Natural Sciences, Engineering and Mathematics, Mid Sweden University	Forest ecology researcher network	Sweden
School of Forest Sciences, University of Eastern Finland – Joensuu	Forest ecology researcher network	Finland
University of Sheffield, Department of Molecular biology and Biotechnology	Joint publications	United Kingdom
University of Ulm	Joint research	Germany
University of Giessen	Joint researh and publications	Germany
University of Bordeux	Joint Osmose project	France

University of Essen	Joint researh and publications	Germany
Research Institutes		
The James Hutton Institute (formerly, Scottish Crop Research Institute)	Joint publications, joint use of high throughput barley SNP genotyping platform	Scotland, UK
Rhododendron park and Botanical Garden Bremen	Joint projects	Germany
T.J. Rud. Seidel Rhododendronkulturen	Joint projects	Germany
Institute of Clinical and Molecular Virology, University of Erlangen-Nurenberg	Joint publications	Germany
CRMN Nuclear resonance institute , Lion, France	Joint research, publications	France
Enterprises		
Medigen	Joint research, publications	USA
International conferences, workshops and seminars organised by the institution/unit		
1st Baltic Congress of Microbiology (31.10.2012. – 03.11.2012., Riga, Latvia, organised by prof. A. Rapoport, prof. I. Muižnieks, prof. U. Kalnenieks)		
PRIFOR Workshop "The mosaic forest landscape" in Latvia 26-29 November, 2012		
International Course „Laboratory Animal Science" (6 ECT, organised by prof. V. Kluša and prof. T. Nevalainen, University of Kuopio, Finland)		

4.5. Describe the most important outcomes of the visits and collaboration contacts

(max 2 pages)

Describe here e.g. key joint publications, researcher training, adoption and use of new technologies or new approaches.

Joint patents:

Bachmann, Martin, Storni, Tazio, Maurer, Patrik, Tissot, Alain, Schwarz, Katrin, Meijerink, Edwin, Lipowsky, Gerd, Pumpens, Paul, Cielens, Indulis, Renhofa, Regina. Packaging of Immunostimulatory Substances into Virus-Like Particles: Method of Preparation and Use. United States Patent Application 20120301499. Publication date: 11/29/2012.

Bachmann M.F., Tissot, A., Pumpens, P. Molecular antigen arrays using a virus like particle derived from the AP205 coat protein. European patent EP1532167. Publication date: 01/25/2012.

Bachmann M.F.; Tissont A.; Pumpens P.; Cielens I.; Renhofa R. Molecular antigen arrays using a virus like particle derived from the AP205 coat protein. HK1078880 (A1). Publication date: 2012-06-08

Joint review papers:

Submitted after revision to *Biological Conservation:* Panu Halme[1,2], Katherine A. Allen[3], Ainārs Auniņš[4], Richard H.W. Bradshaw[3], Guntis Brūmelis[4], Vojtěch Čada[5], Jennifer L. Clear[3], Anna-Maria Eriksson[6], Gina Hannon[3], Esko Hyvärinen[7], Sandra Ikauniece[8], Reda Iršėnaitė[9], Bengt Gunnar Jonsson[6], Kaisa Junninen[7], Santtu Kareksela[1], Atte Komonen[1], Janne S. Kotiaho[1], Jari

Kouki[10], Timo Kuuluvainen[11], Adriano Mazziotta[1], Mikko Mönkkönen[1], Kristiina Nyholm[1], Anna Oldén[1], Ekaterina Shorohova[12,13], Niels Strange[14], Tero Toivanen[1], Ilkka Vanha-Majamaa[13], Tuomo Wallenius[11], Anna-Liisa Ylisirniö[15], Ewa Zin[16,17] Challenges of ecological restoration: Lessons from forests in northern Europe.

Pushko P, Pumpens P, Grens E. Development of virus-like particle (VLP) technology from small highly-symmetric to large complex VLP structures. Intervirology 2013, in press (together with Medigen, USA)

Pumpens P., Ulrich R., Sasnauskas K., Kazaks A., Ose V., Grens E. Construction of novel vaccines on the basis of the virus-like particles: Hepatitis B virus proteins as vaccine carriers, In: Y.Khudyakov (Ed.). Medicinal Protein Engineering. CRC Press, Taylor & Francis Group, Boca Raton London, New York, 2009, pp. 205-248. (together with the University of Vilnius, Lithuania, and Friedrich-Loeffler Institut, Insel Riems, Germany)

Brumelis, G., Jonsson, B.G., Kouki, J. Kuuluvainen, T., Shorohova, E. (2011) Forest naturalness in northern Europe: perspectives on processes, structures and species diversity (Silva Fennica)

Joint papers *(only recent and representative papers listed)***:**

Niedre-Otomere B, Bogdanova A, Bruvere R, Ose V, Gerlich WH, Pumpens P, Glebe D, Kozlovska T. Posttranslational modifications and secretion efficiency of immunogenic hepatitis B virus L protein deletion variants. Virol J. 2013 Feb 25;10(1):63. [Epub ahead of print] (together with University of Giessen)

Mezaka, I., Legzdina, L., Waugh, R., Close, T. & Rostoks, N. (2013). Genetic diversity in Latvian spring barley association mapping population. In Advance in Barley Sciences (Zhang, G., Li, C. & Liu, X., eds.), pp. 25-35. Springer Netherlands (together with the James Hutton Institute, UK and University California, Riverside, USA).

Niedre-Otomere B, Bogdanova A, Skrastina D, Zajakina A, Bruvere R, Ose V, Gerlich WH, Garoff H, Pumpens P, Glebe D, Kozlovska T. Recombinant Semliki Forest virus vectors encoding hepatitis B virus small surface and pre-S1 antigens induce broadly reactive neutralizing antibodies. J Viral Hepat. 2012 Sep;19(9):664-673. doi: 10.1111/j.1365-2893.2012.01594.x. Epub 2012 May 17. (together with University of Giessen)

Sudmale G, Petrovskis I, Skrastina D, Jansons J, Stahovska I, Akopjana I, Kushnere Z, Pumpens P, Sominskaya I. Analysis of different anti-HCV vaccine prototypes. J Viral Hepat 2012 September; 19 (Special issue: SI Supplement 3):16-17. (together with the University of Essen)

Schmitz N, Beerli RR, Bauer M, Jegerlehner A, Dietmeier K, Maudrich M, Pumpens P, Saudan P, Bachmann MF. Universal vaccine against influenza virus: Linking TLR signaling to anti-viral protection. Eur J Immunol. 2012 Apr;42(4):863-869. doi: 10.1002/eji.201041225. (with the Cytos Biotechnology AG, The Switzerland)

Roseman AM, Borschukova O, Berriman JA, Wynne SA, Pumpens P, Crowther RA. Structures of hepatitis B virus cores presenting a model epitope and their complexes with antibodies. J Mol Biol. 2012 Oct 12;423(1):63-78. doi: 10.1016/j.jmb.2012.06.032. Epub 2012 Jun 28. (with the University of Leads, UK)

Assar S, Kazemi Arababadi M, Mohit M, Nasiri Ahmadabadi B, Pumpens P, Khorramdelazad H, Hajghani M, Araste M, Nekhei Z, Sendi H, Kennedy D. T Helper and B Cell Escape Mutations within the HBc Gene in Patients with Asymptomatic HBV Infection: A Study From the South-Eastern Region of Iran. Clin. Lab. 2012; 58(1-2):53-60. (with the Rafsanjan University of Medical Sciences, Rafsanjan, Iran)

Ling S., Cheng A., Pumpens P., Michalak M., Holoshitz J. Identification of the rheumatoid arthritis shared epitope binding site on calreticulin. PLoS One. 2010 Jul 22;5(7):e11703. (with the University of Michigan School of Medicine, Ann Arbor, Michigan, United States of America)

Visit by Anete Keiša to the University of Silesia provided access to the barley TILLING mutant population, which were screened for induced mutations in two barley genes involved in control of cell death. The results form part of the PhD thesis defended in 2013.

Visit by Baiba Ieviņa to the Scottish Crop Research Institute (now The James Hutton Research Institute) allowed her to develop a retrotransposon-based molecular marker system for endangered coastal plant species Sea Holly (*Eryngium maritimum* L.), which is now published as a **joint paper** in journal Plant Genetic Resources.

Visit by Dr.Anna Mežaka to University of SanktPeterburg has resulted in one publiced in Russian journal and one submitted to SCOPUS index journal.

Visit by Dr. U. Kalnenieks to Prof. Poole's laboratory provide access to expertise and to advanced methods in bacterial electron transport research (e.g., dual-wavelength spectroscopy of cytochromes). Collaboration has resulted in several recent publications (see below).

U. Kalnenieks, N. Galinina, I. Strazdina, Z. Kravale, J.L. Pickford, R. Rutkis, R.K. Poole (2008) NADH dehydrogenase deficiency results in low respiration rate and improved aerobic growth of Zymomonas mobilis. Microbiology 154, 989-994

I. Strazdina, Z. Kravale, N. Galinina, R. Rutkis, R.K. Poole, U. Kalnenieks (2012) Electron transport and oxidative stress in *Zymomonas mobilis* respiratory mutants. Archives of Microbiology, 194, 461-471.

New technologies. Cooperation with Daugavpils University led to development of new technologies in plant cell biology. We started to get deeper insigt into mechanisms of plant cell response to new fluorescent dyes and possibilities to analyze the 3D structure of a cell. Another direction is developing of new techniques to grow DNA containing organelles (nuclei, chloroplasts and mitochondria) in cell free system.

Educational standarts. Cooperation with ministry of education during 2005. – 2011. led to developing of new standarts and programmes in biology for primary and secondary edutacion and support of teachers and students with new teaching materials.

Visit and joint paper in J.Virology by Indriķis Muižnieks and Prof. W. Doerfler from Institute of Clinical and Molecular Virology, University of Erlangen-Nurenberg, Germany demonstrating the stability of palindromic insertion structures of adenoviruses in eukaryotic genome and opening new prospects for understanding of recombination processes during the integration of virus into the host genome.

4.6. Non-academic collaboration

List here the non-academic collaboration, e.g. industry contacts.

Name and Organisation	**Type of collaboration**	**Country**
LVMI "Silava"	Market oriented research	Latvia
Ministry of Education ISEC	Educational materials for students and teachers for primary and secondary school education in biology	Latvia
Other organisations		

5. OTHER SCIENTIFIC AND SOCIETAL ACTIVITIES

5.1. Invited presentations in scientific conferences

Invited plenary and other presentations.

Name	Topic of presentation	Name and time of the conference
Anete Keiša, Nils Rostoks	Auxin response of barley necrotic mutant *nec1*	"The 11th International Barley Genetics Symposium", April 15 – 20, 2012, Hangzhou, China
Nils Rostoks	Molecular marker technologies for plant breeding in Latvia	"Diversity in Plant Breeding and Agriculture: Strategies for Healthy Lifestyle", 30.05.2012. – 01.06.2012., Stende, Latvia
Daina Eze	Introduction to special session of ECCO	XXXI ECCO Meeting, 14. – 15.06.2012., Braga, Portugal

5.2. Memberships in editorial boards of scientific journals

Give only the most important membership. Present names for the most important journals in the field.

Name	Journal	Period
Ģederts Ieviņš	Editor – in – chief, Environmental and Experimental Biology (former Acta Universitatis Latviensis, ser. Biology)	2003 -
Voldemārs Spuņģis	Latvijas Entomologs	2006 -
Voldemārs Spuņģis	Acta Zoologica Lithuanica	2006 -
Izaks Rašals	Proceedings of the Latvian Academy of Science	1996 -
Izaks Rašals	Biologija (Lithuania)	2002 -
Izaks Rašals	Agronomy research (Estonia)	2003 -
Izaks Rašals	Acta Zoologica Lituanica	2008 -
Izaks Rašals	Acta Universitatis Latviensis	2003 -
Izaks Rašals	Acta Biologica Universitatis Daugavpiliensis	2005 -
Viesturs Baumanis	Member of editorial board Proceedings of the Latvian Academy of Science	2003-

5.3. Prizes awarded to researchers, honours and scientific positions of trust

Give only the most important prizes and awards to the personnel.

Name	Prize, position etc.
prof. G. Brūmelis	University of Latvia Award "Communication award"
Dr. I. Čakstiņa	University of Latvia award 2012 "Best Dissertation of the Year"
Prof. P. Pumpēns	Latvian Academy of Science Grand Medal 2012 in recognition for his outstanding contribution to molecular virology and mentoring the next generation of researchers

5.4. Memberships in committees and in scientific advisory boards of business companies or other similar tasks of no primarily academic nature

Give only the most important memberships in governmental and private structures.

Name	Tasks	Period
Guntis Brūmelis	Member of Advisory Council on Research Forests	Current
Guntis Brūmelis	Member of the Biology Expert Commission of the Latvian Science Council	Current
Guntis Brūmelis	Member of the Environmental Science and Education Council	Current
Guntis Brūmelis	Consultant ot the Forest Advisory Council, Ministry of Agriculture	Current
Daina Eze	President of the European Culture Collections Organization	2010 -
Nils Rostoks	Expert in GMO Panel of the European Food Safety Authority	2012 -
Jānis Priednieks	Member of the Scientific Advisory Council, Stock company "Latvijas valsts meži"	2006 -
Pauls Pumpēns	Member of the Latvian Academy of Science	1990 -
Indriķis Muižnieks	Member of the Latvian Academy of Science	1998 -
Indriķis Muižnieks	The Head of the Scientific Advisory Board on GMOs to the Food Council, Ministry of Agriculture, Republic of Latvia	2006 -
Indriķis Muižnieks	Member of the State Committee on Research Qualification, Latvian Academy of Science	2006 -
Izaks Rašals	Member of the Latvian Academy of Science	2001 -
Izaks Rašals	President of Latvian association of genetics and selection	1985 -
Uldis Kalnenieks	Corresponding member of the Latvian Academy of Science	2007 -
Kaspars Tārs	Corresponding member of the Latvian Academy of Science	2010 -

6. THE INSTITUION'S/UNIT'S SELF-ASSESSMENT

6.1 SWOT – evaluation of the Unit's scientific strengths, weaknesses, opportunities and threats

(max 2 pages)

Analyse the Institution's/Unit's scientific expertise and achievements, funding, facilities, organisation and management. What are the major internal Strengths and Weaknesses as well as external Threats and Opportunities in the Institution's/Unit's activities and research environment? Assess what the present Strengths enable in the future and what kinds of Threats are related to the Weaknesses.

Strengths	Weaknesses
• Faculty of Biology, University of Latvia is the only institution in Latvia that in addition to providing higher education at all academic levels carries out basic and applied research in all main branches of modern biology	• Faculty of Biology is primarily a higher education institution, therefore its research capacity is limited by necessity to carry out the primary function • Poor national research funding, even in national priority research directions

• Education in biology is firmly based in science, thus, students at all levels are encouraged to develop their research interests and participate in research projects • Most of the Faculty personnel are involved in research activities, mostly in the form of research grants • Faculty of Biology is now located in completely renovated facilities (over 2000 m^2) including research laboratories • Basic research infrastructure has significantly improved in the past 5 years • Total research funding has significantly increased during the past 2 years (*but see Threats*) • Collaboration with other UL faculties, UL research institutes, and other research institutions in Latvia provides access to a wide range of research infrastructure and expertise • Research capacity of Faculty of Biology is increasing as a result of increased number of PhD students • Total research output of the Faculty of Biology in terms of peer-reviewed papers and patent applications is increasing	• Fragmented funding that is provided through several ministries and their agencies each with their own set of grant management rules and specific objectives • Lack of internationally recognized scientific journals in biology indexed in the major databases (Thomson Reuters, Scopus), primarily caused by lack of funding for such publications and editorial staff • Relatively low number of publications in peer reviewed journals, especially with high impact factor, leading to low prestige of our science and, consequently, to low success rate in competition for EU and international research grants • Relatively low number of patents, especially at EU and international level, reflecting low capacity for innovation in our research community • Low involvement of industry in research funding linked to their disillusionment in our capacity to innovate and to general lack of funds • Even though research infrastructure and capacity of human resources has generally improved in the past 5 years, some biology disciplines are still lacking basic research infrastructure and, consequently, fail to attract students and research funding • Insufficient level of collaboration with other research institutions in the Baltic countries and the Baltic sea region leads to duplicated efforts, and lack of access to research infrastructure
Opportunities	**Threats**
• Relocation of the Faculty to the Tornakalns Academic Centre for Natural Sciences in 2015 may give access to better research facilities and equipment • Relocation of the Faculty to the Tornakalns Academic Centre for	• Most of the research in 2006 – 2012 was funded through Latvian Council of Science and European structural funds. Most of the ESF expire in 2012 – 2013, and no funding has been attracted in the form of Latvian Council of Science grants (2013 –

Natural Sciences in 2014 will lead to better opportunities for collaboration with the Faculties of Chemistry, Medicine and Geography and Earth Sciences • EU Social Fund (ESF) provides support to master and PhD level students and facilitates involvement of students in research, thus, increasing research capacity and training human resources • Support from EU Regional Development Fund (ERDF) to establish National Research Centers will allow to improve research infrastructure in several biology disciplines, while other ERDF activities provide funding for specific research projects in the areas of national priority • Efficient and more extensive collaboration with other Faculties of UL, UL research institutes and other research institutions in Latvia will increase number interdisciplinary research projects • New collaborations can facilitate more efficient utilization of existing research infrastructure and more extensive involvement of students in research projects • More efficient science communication for both general public and science policy makers can improve public perception of biology in Latvia, and provide more favorable research environment • Continuous improvements to the Center for field training "Kolkas vecā skola" can transition it into an international training and monitoring site in fields of botany, ecology and zoology • The scientific journal *Environmental and Experimental Biology* (formerly *Acta Universitatis Latviensis*) has increased the number of issues per	2016) • Apparent lack of planning for the national science funding after completion of the current ERDF and ESF programming period • Unclear national policy on incremental annual increase of science funding (percent GDP) up to an average EU level and limited number of application calls for national funding • Frequent changes in national research priorities that prevent funding of long-term research efforts in certain biology disciplines • Relocation of the Faculty to the Tornakalns Academic Centre for Natural Sciences in 2015 may lead to decreased area for research facilities • Increased amount of bureaucratic hurdles that complicate grant application and management process

year and eventually may become the first scientific journal in biology from UL to be indexed by major international science databases. At the same time *Proceedings of the Latvian Academy of Sciences, Section B: Natural, Exact, and Applied Sciences* is now indexed in Scopus	

6.2. Evaluate the Unit in relation to its leading scientific competitors

(max 1 page)

How does the Institution/Unit perceive itself in the international context? What is the "niche" of the Institution/Unit in the global research environment? What characteristic features distinguish the Institution/Unit from its international competitors? What are the most relevant competitors (university departments or other research institutions) of the Institution/Unit in the international context? What are the main channels through which the Institution/Unit interacts with the international scientific community? Are the professors and leading researchers at the Institution/Unit active in international learned societies etc.? What are the most relevant research projects the Institution/Unit has been engaged in during the assessment period jointly with other institutions in Latvia or abroad? Has the Institution/Unit been the main organizer of major international conferences?

The main strengths of the Faculty of Biology, UL are related to research of national and regional importance, such as hydroecological studies of the Baltic Sea, or characterization of the rich biodiversity of Latvian flora and fauna. An example of a successful integration of national and international research effort in which FB took active part was Latvian National research programme 2006 – 2009 "Climate change impact on water environment in Latvia" and the BONUS ERA-NET Joint Baltic Sea research and development programme. In the field of forest ecology and management, rather than competing with international competitors, close co-operation has developed with research groups in Fennoscandia, resulting in review articles on several aspects of this field. In the field of dendroclimatology, BF is the leading research group nationally. Also, in terms of Web of Knowledge published papers in the larger field of forest ecology, BF has become the leader among forest research centres nationally. FB cooperates with governmental and non-governmetal (Latvian Fund for Nature, Latvian Ornithological Society) organizations in carrying out various monitoring and environmental protection projects funded by EU, e.g., LIFE/Nature project on conservation and management of coastal ecosystems. FB also has a very strong emphasis on biomedicine and biotechnology, where cooperation with Latvian Biomedical Research and Study Centre and Institute of Microbiology and Biotechnology is essential. Recently, the basic research on human autologous stem cells initiated at FB has resulted in establishment of the Cell Transplantation Centre at the Paul Stradins Clinical University Hospital. Strong emphasis on soil and environmental microbiology has resulted in practical applications in agriculture, bioremediation and sewage treatment. Latvian Microbial Culture Collection is the only internationally recognized repository in the Baltic States for microbial strains used in basic research, as well as in various types of biotechnology industry, which currently holds over 1,200 different accessions. FB has strong links with the Botanical Garden of the UL and the Rhododendron Breeding station "Babīte", where 19 internationally registered rhododendron varieties have been developed. As noted in section G.1. of the self-evaluation report, FB carries out research activities in most of the areas of modern biology, as well as interdisciplinary research in collaboration with other research institutions in Latvia and abroad. While clearly some research directions are better represented, and probably

better recognized internationally, solid research is carried out in all the areas of modern biology, the fact, which is supported by peer-reviewed papers and the growing number of PhD students. In general, research personnel of the FB consider themselves as a part of international research community; attend and organize international scientific meetings; interact with their international peers through meetings, joint projects and international professional organizations.

6.3. The Institution's/Unit's research strategy (relation to the state'/parent organisation's strategy, research priority areas, development measures, performance indicators)

(max 2 pages)

Describe the Institution's/Unit's research programme for the next 5 years, the key research objectives and means to achieve these objectives. What is the role of basic and applied research? Is there need for new knowledge, facilities; is the present level of funding sufficient for attaining the objectives laid down? Do the strategies of State and the Institution/Unit support each other? How do you take into account the possible ethical questions within research?

The research programme of the FB is based on the National research priorities 2010 – 2013 and the Strategic plan of the UL 2010 – 2020 that sets the goal to establish the UL as research University that educates and attracts high level researchers. Accordingly, the FB carries out most of the research projects under the National research priorities, while at the same time providing staff and students with opportunity to develop new research directions and to follow their research interests that may one day form the basis for national priorities. The research programme has four broad aims: 1) integration of research and studies; 2) internationally significant research; 3) knowledge transfer and commercialization; 4) science communication. Specifically, research will continue to be focused on Latvian natural resources and biodiversity, as well as on selected areas, where international recognition can be achieved, such as certain aspects of hydrobiology, biomedicine, biotechnology and plant science. Strong emphasis on the knowledge transfer and commercialization will need to be developed in certain areas, while recognizing that basic 'blue sky' research is important in attracting students to science. Science communication has always been recognized at the FB as an important task and this tradition will be continued by collaborating with primary and secondary schools; organizing biology Olympiads and the School of Young Biologists, participating in Science Café's and various other activities. Development of the research infrastructure is linked to building of the new Centre of Natural Sciences in Tornakalns area, which will provide new facilities for studies and research. Part of the research funding will be provided by the ERDF funding for the Research Centres of National Significance (RCNS). FB directly participates in development of three of the RCSN – pharmacy and biomedicine, agriculture and food, forestry and water resources. Biosafety and bioethics are at heart of modern biomedical and biotechnology research. The FB actively participates at formulating biosafety and bioethics standards in research; faculty members advise for the medical ethics committee; the research carried out at the FB is performed with all the necessary authorizations for work with animals, human cell cultures, transgenic plants etc. Recently, biosafety and bioethics standards at the UL are strengthened by carrying out a ESF co-funded project "Capacity building for interdisciplinary biosafety research" that aims at improving capacity and establishing biosafety standards in various aspect of biotechnology, by bringing together experts in biology, medicine, social sciences and anthropology, and law.

6.4. The societal impact of the Institution's/Unit's activities

(max 1 page)

What are the main channels through which the Institution/Unit interacts with the society at large? Describe here how the Institution's/Unit's research activities and cooperation with other organizations have promoted the activities of other societal actors, e.g. industry or SMEs. What are the most important research projects the Institution/Unit has carried out with non-university partners from the public or private sector during the assessment period? Has the research of the Institution/Unit produced spin-off companies? Are the members of research active staff preferred experts also outside the academic research field?

Considering that the FB is primarily the higher education institution and its research activities are mostly to support science based education at the UL, it is clear that the research carried out at the FB has an impact on broad range of society's functions. FB alumni are employed in governmental and non-governmental organizations, small and medium size enterprises, and, of course, they carry on the education function of the FB, both as formal teachers in schools and universities, but also as formal and informal experts in various aspects of contemporary biology. One of the most apparent functions of the FB personnel and alumni is active participation in environmental protection activities including research on endangered plant and animal species, ecosystems, specific protected areas and development of sustainable management measures. These activities are mostly carried out through NGOs, e.g., Latvian Fund for Nature, with active participation of FB research personnel and PhD students. The FB personnel serve as both formal experts, e.g., Supervision Council for Genetically Modified Organisms at the Ministry of Agriculture, or as independent experts, e.g., in the field of forestry. The basic research on human autologous stem cells has resulted in cell therapies that are carried out by the Cell Transplantation Centre of the Paul Stradins Clinical University Hospital, while results from the research on bioremediation and sewage treatment are being implemented through Eko Osta Plc. Contacts with the biotechnology, pharmacology and agriculture industry are maintained through professional associations, such as Association of Biotechnology of Latvia, Latvian Society for Microbiology, Latvian Society for Genetics and Breeding and Latvian Biochemical Society, or directly with businesses, such as BioSan, Madara Cosmetics, Grindeks and Silvanols.

6.5. Assess the role of the Institution/Unit in doctoral training as well as academic and societal need for doctoral training within the Institution's/Unit's research fields

(max 1 page)

Is the placement record of the Institution's/Unit's doctoral graduates from 2012 available for inspection? Has the Institution/Unit been able to place doctoral graduates into foreign universities on non-Latvian funding? Are the professors and leading researchers at the Insitution/Unit active in tenure and doctoral committees etc.?

The list of dissertations defended in 2012 – 2013 is provided in the section 3.2. of this self-evaluation report along with the information on current employment of holders of Dr. biol. A recent PhD graduate Inta Dimante – Deimantoviča is currently employed by the Norwegian Institute for Nature Research (Norway, Norwegian funding). However, considering the general lack of PhDs in Latvia compared to other EU countries (http://izm.izm.gov.lv/upload_file/Zinatne/peer_rewiev_2010.pdf), it is worth noting that most of them are currently employed in Latvia. Most of them have spent part of their doctoral studies abroad as recipients of various foreign scholarships, therefore they bring with them research experience in international environment. The bleak future prospects of research funding in Latvia, however, may force these highly qualified human resources to look for postdoc positions abroad.

The Faculty of Biology is one of the two Latvian Universities that offer PhD programme in biology (the other being Daugavpils University). Enrollment in the programme is carried out annually, with

an average of ca. 15 state funded positions available, but usually more students enroll, if research project appears to be sound and funding is available. The PhD students can study most of the aspects of contemporary biology, by choosing a supervisor either from FB, or from one of the many collaborating research institutions. During the past six years (2006 – present) doctoral degrees in biology have been awarded to 51 students (see section 3.2. of the self-evaluation report) and this number is set to increase thanks to the financial support from the European Social Fund co-financed project, which provides motivation and financial stability to complete the studies. A number of early stage researchers with doctoral degrees have become teachers at the FB (D. Elferts, G. Tabors, E. Zviedre, A. Čeirāns), while others have permanent positions at other research institutions. There are examples of students that are enrolled at the FB, but the actual research project is carried out in a foreign research institution and funded by non-Latvian funding, e.g., European Comission Joint Research Centre in Ispra (Italy) or University of Helsinki (Finland). In order to promote collaboration among PhD students and to facilitate interdisciplinary research, several PhD schools were established in 2009 at the UL. Biology students participate in the three schools related to plant and soil resources, biomedicine, and zoology and animal ecology. Lectures are given by leading researchers and professors from UL, from other Latvian research institutions and universities, as well as from abroad. In particular, a number of foreign opponents at the PhD defense have also given invited talks at the PhD schools. Professors and leading researchers from the FB supervise PhD projects, actively participate in PhD schools and take part in the annual evaluation of the progress of PhD students.

6.6. Assess the Institution's/Unit's research infrastructure

(max 1 page)

Describe the use and availability of research infrastructure (including research equipment, computer resources, databanks, material collections, archives, research management, support services and technical staff) both for staff of the Institution/Unit and for outside users.

The FB is located in a renovated part of the building on Kronvalda Blvd. 4 consisting of over 2000 m^2 of office, auditorium and laboratory space. The renovation that was funded by ERDF, Ministry of Education and Science and UL included both facilities and purchase of new equipment for research and education. FB has received European funding in form of research grants and infrastructure support, as well as other national and international funding. As a result all necessary general research equipment is available. Specialized equipment, e.g., for DNA sequencing, genotyping and animal research, is usually available through collaborations and service contracts with other research institutions in Latvia and abroad. The development of research infrastructure at the FB is centered on building of the new Centre of Natural Sciences in Tornakalns. The ERDF funding for improvement of research and higher education infrastructure will be used not only for the building, but also for research equipment. Together with the existing investments in research equipment this should establish FB as a modern research centre in most of the areas of biology available also to researchers from other institutions. In fact, the conditions for establishment of RCNS foresee that the research facilities and equipment are accessible to the other members of RCNS, e.g., Latvian Biomedical Research and Study Centre, Latvian University of Agriculture, and several institutes of plant breeding. Latvian Microbial Culture Collection serves as a regional centre for depositing microbial strains, currently with over 1,200 accessions stored in liquid nitrogen. The growth and maintenance of collection is warranted by the acquisition of a new liquid nitrogen storage tank in 2011.

During the past years significant improvements have been made to the field training site "Vecā skola" in Kolka village. As a result, there is increasing number of visitors to this site including researchers from Latvia and abroad, which may potentially position the site as an international research centre in zoology, botany and ecology. FB also has some other research facilities, e.g., Laboratory of Bioanalytical and Biodosimetry Methods in Kleisti area, which serves as a site for research in specific areas, e.g., basic research on stem cells and plant biotechnology. These facilities

are maintained with funding from UL and various research projects, and are made available to researchers from other research institutions, e.g., equipment for fluorescence-activated cell sorting is used extensively by researchers and PhD students from Latvian Biomedical Research and Study Centre.

7. FUNDING

7.1. The Institution's/Unit's funding for scientific activities

(in LVL)

Core (maintenance) funding applies to the Institution's/Unit's budget received annually under the Regulations No1316 adopted by the Cabinet of Ministers on 10th November 2009. The funding covers both the salary costs with taxes and operational costs. Use of research funding received from external sources, indicated per year.

Sources of funding	**2012**	**Total 2006-2012**
State budget funding	77 086	1 968 010
Core (maintenance) funding	8 000	514 560
Grants of the Latvian Council of Science	66 226	583 310
State research programmes	0	276 241
Other state budget funding	2 860	593 899
Other sources of finances	365 789	1 745 450
Contract research	12 146	20 226
ESF, ERDF funding	350 989	1 664 095
Framework programme projects	2 654	59 035
Other international projects	0	2 094
Private funding	0	0
Other	0	0
Total	**442 875**	**3 713 460**

7.1.1. Characterise the international competitiveness of the Institution/Unit in attracting the funding (number of projects granted, types of the projects (EU Framework Programmes, European Cooperation in Science and Technology (*COST*), North Atlantic Treaty Organisation (*NATO*), other international projects) in 2012) *(name of project, project execution time, allotted funds for project)*

EU Framework Program projects: (*Networks of Excellence, Specific targeted research Project, Collaborative Project*):

Other EU Framework Program projects:

1. 7th Framework programm project: Impact of Citizen Participation on Decision-Making in a Knowledge Intensive Policy Field (2009.-2012.).

Other international projects:

1. 2010- 2013: COST Action FP0905 „Biosafety of forest transgenic trees: improving the scientific basis for safe tree development and implementation of EU policy directives"

2. 2009- 2012: COST Action TD0801 „Statistical challenges on the 1000€ genome sequences in plants"

7.1.2 Characterise the potential contribution of the Institution/Unit in economical development – the orientation to commercialization of the research and implementation of

the results of research (collaboration with **industry partners/entrepreneurs**, contract research, Market-oriented research projects, and International support program for market-oriented R&D and innovation projects by industry to develop innovative and competitive products (*EUREKA*) in 2012):
(name of project, time period, funding)

Market-oriented research projects

***EUREKA* projects**

Contract research:

1. L-2746-ZR-N-090 Contract research for isolation of microbial cultures.
2. L-2756-ZE-N-090 Isolation and growth of rabbit bone marrow mesenchymal stem cells.
3. L-2777-ZR-S-090 Control and evaluation of microbial contamination in production facilities for tree meristem cultures.
4. L-2782-ZR-N-090 Research on microbial contamination of museum exhibits and facilities.
5. L-2797-ZE-S-090 *In vitro* evaluation of plant extracts and its fractions.
6. L-2810-ZE-N-090 Isolation and growth of rabbit bone marrow mesenchymal stem cells
7. L-2828-ZE-S-090 *In vitro* evaluation of the effects of combinations of plant extracts.
8. L-2833-ZR-S-090 Monitoring of distribution of mosses and lichens in the forests of Riga municipality.
9. L-2834-ZR-S-090 Control and evaluation of microbial contamination in production facilities for tree meristem cultures.
10. L-2837-ZR-S-090 Evaluation of antimicrobial activity of plant extracts.

7.2. Evaluate the role of different funding sources (State and different funding organisations) in promoting the scientific and societal impact of research

(max 1 page)
Describe how the funding awarded by State and other sources has supported the Institution/Unit in achieving the Institution's/Unit's scientific and societal impact. Scientific impact refers to the contribution of the research carried out by the Institution/Unit to the development of the field. Societal impact refers to the ability of the research activities to promote values that are considered as important in society.

In 2012, the research funding of the FB exceeded the funding for academic study programmes in biology, which outlines the importance of research in providing high quality academic education. Availability of research funding is absolutely essential for PhD projects in biological sciences, as the students need to cover their material and reagent costs. During the past years availability of research funds has resulted in increased number of PhD students, which also has resulted in increased number of peer-reviewed papers and defended PhD theses. However, the majority of research funding is provided by European Social Fund and European Regional Development Fund, with majority of the projects set to complete in 2012 or 2013. The national funding in the form of Latvian Council of Science research grants and collaborative projects provides a relatively smaller part of research funding for FB. There currently are no clear prospects of increase in national research funding, which may lead to a situation, when significant number of younger researchers and research groups that were formed with the support of EU structural fund, leave the FB. This situation is not unique to FB; therefore it must be decided at national level, that the research funding needs to be increased.

Instructions to submission form

G.1. Main scientific fields of the Institution/Unit

In total the percentage of all fields and directions in the Institution/Unit should add up to 100%.

G.2. Other fields in relation to the main scientific fields of the Institution/Unit

This part describes the interactions between the main scientific fields of the Institution/Unit with other fields. These fields are defined taking into account the list of science fields in appendix. The interactions can be characterized in three ways: 1 – simple collaboration, which results in common scientific publications; 2 – collaborative projects involving consortium of partner organizations; 3 – scientific groups attract specialists from different fields.

1. Personnel

1.1. Provide the information in terms of full time equivalents (FTE). FTE refers to annual full-time work (40 hrs per week). If a person's working time in the institution/unit is 40% of that of normal working time (i.e., 16 hrs per week), but other time is spent in different work (for example, teaching, administrative duties, consultations, this is calculated as 0.4 FTE.
Active research staff includes persons who plan, produce and publish new knowledge, theories and methods as well as products and processes based on them and lead research projects.
Technical personnel refer to persons working under the supervision of active research staff to carry out projects but who are not involved in the theoretical planning, publishing or other related activities.
Administrative personnel refer to persons who take care of administrative tasks related to the research, such as financial and personnel administration or other office duties but who are not normally involved with the technical implementation of the projects.

Persons under the following titles will be listed in the active research staff:

- Professor
- Associated professor
- Docent
- Lector
- Assistant
- Leading researcher (vadošais pētnieks)
- Researcher (pētnieks)
- Research assistant (zinātniskais asistents)

PhD students or young scientists who have just acquired the degree can be employed in the above mentioned positions. Therefore, the number of PhD students must be provided in a separate row.

2. Research output of the Institution/Unit

2.1. This question surveys how the research carried out in the Institution/Unit has impacted research in its own field(s). Provide the indicators of scientific publishing, most important research results and the role of multidisciplinarity or interdisciplinarity; describe the role of basic and applied research.
In case the research carried out in the Unit is clearly specialised in the different fields of science, describe each field separately.
2.2. In the summary table, calculate the number of each type of outcome in the list during the period under review.
2.3. Each leading researcher will list 7 of his/her key publications during the period under review. The list may also include manuscripts published in 2012 or manuscripts approved for publication but still unpublished.
The year and place of publishing, editor, and publisher must be listed for books.

Samples for reference list:

Lapiņš K., Bergs I.: Insight in NLO polymer material behavior by Langevin dynamic modeling of chromophore poling, Integrated Ferroelectrics 123(4), pp. 53–65, 2011. http://dx.doi.org/10.1080/10584587.2011.570635

Bērziņš J., **Krūmiņš P.**, Lapiņš, K.: Fabrication of Ultrathin Anodized Aluminum Membranes for Deposition of Nanodot Arrays, Proceedings of the International conference „Nanomaterials and Nanotechnologies FM&NT" (Riga, Latvia, April 11-13, 2011), pp. 372-383.

Bērziņš J., **Krūmiņš P**., Lapiņš, K.: Effects of Temperature on Electron Paramagnetic Resonance of Dangling Oxygen Bonds in Amorphous Silicon Dioxide, Proceedings of the International conference „Nanomaterials and Nanotechnologies FM&NT" (Riga, Latvia, April 11-13, 2011), to appear.

Auzinsh M., Budker D., Rochester S. Simon: Optically Polarized Atoms: Understanding light-atom interactions, Oxford University Press, Oxford New York, 2010.

Bērziņš J.: European projects in Latvia, Background report for The Ministry of Education and Science, in Latvian at: http://www.izm.lv/events/

Berzinsh J., Kruminsh P., **Lapina, K**.: Influence of corona poling procedures on linear and non-linear optical properties of polymer materials containing indandione derivatives as a cromophores, SPIE Proceedings, Organic optoelectronics and photonics III (Eds. P.L.Heremans, M.Muccini, A.Meulenkamp), 6999, pp. 1-25, 2008.

2.4. For ensuring easy readability do not make the font size smaller when copying publications. The copies of publications shall be two-sided.

3. Doctoral training

Give the number of Master degrees defended and number of students enrolled in the doctoral training.

If at least half of the Master thesis/doctoral dissertation has been supervised and/or done at a research institute, the research institute can also list the Master thesis/doctoral dissertation as its own outcome. In this case indicate also the university (and the year of completion) where the Master thesis/doctoral dissertation has been presented for approval. In present employment, indicate the type of organisation (university, business company, research institute, state, municipality or other).

4. National and international collaboration

4.1. List the national collaboration partners of the Unit. Collaborator refers to a person or a research team with whom the cooperation has either generated or is expected to generate within the next three (3) years one of the outcomes indicated in item 2.2. Types of collaboration include e.g. joint projects, researcher mobility. In "Field of science", give the main field of the collaborator (physics, chemistry, mechanical engineering etc.) and describe it with some key-words.

4.2–4.4. List the visits per year. List the visits by country in the alphabetical order. In item "Purpose of the visit" indicate clearly the objective of the visit.

4.5. List the most important foreign collaborators, as defined in item 4.1.

4.6. Describe here e.g. key joint publications, researcher training, adoption and use of new technologies or new approaches.

4.7. List here the non-academic collaboration, e.g. industry contacts.

5. Other scientific and societal activities

5.1. Invited plenary talks, and other invited talks

Evaluation of the research performance of Latvian research institution (2012)

5.2-5.4. Give only the most important memberships and prizes

6. The Institution's/Unit's self-assessment

Self-assessment is an important part of the evaluation. Please answer carefully.

6.1-6.2. In addition to strengths and weaknesses it is also very important to assess what the present strengths or developable strengths enable in the future and what kinds of threats are related to the weaknesses.

6.3. Describe the Unit's research programme for the next few years, the key research objectives and means to achieve these objectives. What is the role of basic and applied research? Is there need for new knowledge, facilities; is the present level of funding sufficient for attaining the objectives laid down? Do the strategies of the Institution/Unit and the State support each other? How do you take into account the possible ethical questions within research?

6.4. Describe here how the Institution's/Unit's research activities and cooperation with other actors in society have promoted the activities of other societal actors, e.g. industry of SMEs.

6.6. Describe the use and availability of research infrastructures, e.g. computer resources, research equipment.

7. Funding

7.1. The funding covers both the salary costs with social charges of the staff and the operational costs which include consumption costs and investment costs for research activities.

7.2 Describe how the funding awarded by the State and other sources have promoted the scientific and societal impact of the Institution's/Unit's activities. Scientific impact refers to the contribution of the research carried out by the Institution's/Unit to the development of the field. Societal impact refers to the ability of the research activities to promote values that are considered as important in society.