

Report of the International Peer Review
of the
Graduate School
VLAG
June 2009

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Table of Contents

Preface	5
Executive summary	7
1. Introduction	9
1.1 The evaluation	9
1.2 The assessment procedure	9
1.3 Results of the assessment	10
1.4 Quality of the information	11
2. Structure, organisation and mission of the Graduate School	13
2.1 Organisational structure	13
2.2 Mission and research themes	15
2.3 Responsibilities, governance and funding	15
2.4 Research organisation and input	17
2.5 Supervision and training of PhD scholars	19
3. Performance of the Graduate School	21
3.1 The identity of the institute and the mission statement	21
3.2 Management and leadership	21
3.3 Strategy and policy	22
3.4 Research staff	23
3.5 Resources, funding and facilities	24
3.6 Academic reputation	25
3.7 Scientific and social relevance	25
3.8 The primary processes,	26
3.8.1 Research	
3.8.2. Training and education	
3.9 Prospects and expectations for the graduate school	28
4. Performance of the individual Chair groups / Research lines.	29
4.1 VLAG Wageningen Chair groups	31
4.2 NUTRIM Maastricht Research lines	63
Annexes	73
1. Main characteristics of the SEP and interpretation of criteria	75
2. Checklists	79
3. Brief Curriculum Vitae of the Committee Members	81
4. Programme for the VLAG Peer Review 2009 site visit	91
5. Chair groups / research lines versus large research conglomerates	95

Preface

This report embodies the findings and recommendations of an international peer review of the national Graduate School VLAG undertaken over four days from June 15 to June 18, 2009. The review is both prospective and retrospective and has relied on quantitative as well as qualitative analysis of the school and its activities. The report presents findings on the Institute as a whole and on the individual Chair groups / Research lines making up the school, and the review has resulted in a set of specific recommendations and some more general observations.

The Review Committee gratefully acknowledges the assistance given by the Management Team of VLAG and by the two academic secretaries to the group, Dr Wil Meulepas at Wageningen University and Dr Dorine Collijn at Maastricht University. The group is especially grateful to Dr Vesna Pršić who provided a flawless organisation service to the group.

August, 2009

Prof. Brian McKenna
Chairman, International Peer Review Committee

Executive summary

- The review committee was impressed by the overall excellence of VLAG both in its Wageningen and Maastricht locations. Of course, there were individual subsection variations, as would be expected in such a large organization, but even in the relatively few lower performing groups there was significant evidence of excellence.
- The review committee was pleased with the level of identity of VLAG both within the research staff and within the PhD student cohort.
- The mission statement of VLAG has been well refined and is now a very good statement of VLAG's intent. It is also worded in a sufficiently broad form that all stakeholders are able to adhere to its principles. VLAG through its cross university and cross-disciplinary nature is a unique academic community in research and doctoral education.
- The structure is complex but efficient, being different in each university. Consequently, management and major financing lines do not run directly via VLAG. However, despite this constraint, the management of VLAG performs well in its role of nurturing educational aspects of the PhD programme and in promoting interdisciplinary activity through its PhD sponsorship.
- VLAG is performing well in its mandate to deliver highly skilled researchers and high quality research to its primary stakeholders, society at large and the agri-food industry. However, in further developing this dual applied focus, the continued input of the fundamental basic sciences remains essential (see also annex 5).
- The research quality of each Chair group and Research line was assessed rather than that of individual researchers. Individual researchers are the subject of ongoing individual assessment and we recommend that these be continued.
- There are several staffing issues that need addressing at an institutional level. These include the ratio of tenured to non-tenured staff (internally funded to externally funded), the low proportion of staff recruited from outside the Netherlands, the low proportion of female staff in senior positions, an equal opportunities policy, succession planning and career tracks for post docs and PhDs.
- Investment in staff and facilities is essential for the maintenance of a world-class academic reputation. We recommend that continued investment will remain a high priority with VLAG management in both universities.
- The rigorous application of education delivery and research support mechanisms should be continuously reviewed and enhanced where possible.
- All research groups are considered competitive both nationally and internationally and have an excellent scientific record. Scientific bibliometric data formulation differs across the two VLAG universities making cross university comparisons difficult. However, current assessment metrics could be enhanced by the addition of other metrics that are more closely related to the societal mission (e.g. patents, etc.).
- The future offers great prospects for VLAG once it can maintain and increase staff numbers, either internally funded or through increases in the level of external research funding. VLAG has the expertise range to participate in most areas across the food chain, but the Committee feels that there is still more to be gained from the cooperation with the research institutes.

- For VLAG Wageningen greater visibility might be achieved through more focus on the AFSG clusters rather than the individual Chair groups.

Introduction

1.1 The evaluation

All publicly funded university research in the Netherlands is evaluated at regular intervals, as agreed by the Association of Universities in the Netherlands (VSNU), the Netherlands Organisation for Scientific Research (NWO) and the Netherlands Academy of Sciences (KNAW). The evaluation process, which is applied at the research unit level, consists of an external peer review conducted every six years and a three-year interim review undertaken through self-evaluation.

The evaluation system aims to achieve three objectives:

- *improvement* in the quality of research through an assessment carried out according to international standards of quality and relevance;
- *improvement* in research management and leadership; and
- *accountability* to the higher management levels of the research organisations and to the funding agencies, government and society at large.

The intention is that these responsibilities of VLAG are evaluated in this peer review with the overall aim of achieving an accurate view of the performance of VLAG and in particular the position of its research groups within the (inter)national science and education arena (retrospective) and to find ways for further improvement (prospective). Therefore the peer review takes into account not only the quality of the work conducted and the ways that the results are communicated, but also the institution's broader mission. This includes evaluation of the arrangements and programmes for PhD students, who conduct much of the scientific research, and also of the relevance, quality and effectiveness of the work in terms of the institution's wider mission and public accountability.

1.2 The assessment procedure

The evaluation procedures followed by the Review Committee were those set out in the NWO/VSNU/KNAW "Standard Evaluation Protocol 2003-2009 for public research organizations" as adopted by Wageningen UR (version March 2009).

This Standard Evaluation Protocol entails two main characteristics:

- *Two levels of assessment*: The assessment takes place at two levels of research organisation, i.e. the level of the Graduate School (A-level) and the level of Chair groups / Research lines (B-level);
- *Four main criteria*: The assessment entails four main criteria, i.e. quality, productivity, relevance, and vitality & feasibility.

The evaluation committee was requested to report its findings in line with the four main criteria. With respect to evaluation of the institute as a whole the findings should be reported in qualitative terms with a focus on policy and management questions. For the assessment of the research groups, the verdict should be cast in both qualitative and quantitative terms. In the text, the most important considerations of the committee should be clarified, while the conclusion should be summarized in a single term according to a five point scale, "excellent" meaning world class research, and "unsatisfactory" meaning below standard (annex 1). Checklists were provided (annex 2) as a tool for assisting in assessment.

The assessment was based on and supported by three main components of evidence:

- substantial self evaluation reports (parts A and B) of NUTRIM Maastricht and VLAG Wageningen, detailing the operation, management, research activities, outputs, and SWOT analysis of the VLAG Graduate School and its research groups;
- copies of the selected papers from each research group and dissertations, to allow the Committee to examine in detail examples of published work;
- discussions with researchers, PhD students and council, academic staff and research managers about the details and conduct of the programmes of work and the operation of the VLAG Graduate School.
- Discussions with allied research institutes NIZO, RIVM, TNO and the DLO counterpart A&F

Some of these evidence components were quite quantitative in nature except for the interviews which gave significant qualitative evidence and resulted in some review panel comments which might be seen to be at variance with the written documents.

The site visit was undertaken during the period 15 June - 18 June, 2009 and consisted of a number of components, which can be summarised as follows:

- a plenary introduction to Wageningen UR and VLAG by the Rector of Wageningen University and the Scientific Director of VLAG-Wageningen and VLAG NUTRIM;
- discussions with Wageningen VLAG / NUTRIM staff and VLAG PhD students
- sub-committee sessions with VLAG Education staff, PhD Students' Council and some PhD Students;
- sub-committee sessions with individual Chair groups / Research lines ;
- sub-committee visits to laboratories and experimental facilities at Wageningen;
- a debriefing meeting with the Rector of Wageningen University, Scientific Directors of VLAG Wageningen and NUTRIM Maastricht and VLAG Management Team and a representative of VLAG International Advisory Board
- a final debriefing meeting with all involved staff

The Peer Review Committee comprised 14 peer members and a secretary (annex 3). Despite a full programme (annex 4) and a tight schedule the Committee was able to complete all the interviews in a satisfactory way. Consequently the final report with the conclusions and recommendations was formulated by the Committee as a whole. As would be expected with such a large group of peer reviewers, there was not always full unanimity. Where any decision was not unanimous, the chairman decided to give prevalence to the conclusions of the real peers on this discipline. The draft report was presented to the director of VLAG to redress any (factual) errors.

1.3 Results of the assessment

This report summarises the findings, conclusions and recommendations of an international peer review of the VLAG Graduate School undertaken in June 2009. The period, that was covered by this assessment differs between VLAG Wageningen and NUTRIM Maastricht. For VLAG Wageningen the assessment covered the period between 2003 and 2008, whereas for NUTRIM Maastricht the assessment was mainly focused on performance over the period 2007-2008.

The written and oral information permitted a good understanding of the organisation by the Committee. The assessment of VLAG and its research groups was subsequently based and weighted according to the rationale explained in annex 1. This means that the performance of the groups was benchmarked against the performances of other groups in the global arena of comparable disciplines. The conclusions, as given in chapters 3 and 4 of this report, follow the structure and the criteria which are formulated in the Terms of Reference, annex 1. Chapter 3 gives an impression of the performance of the Graduate

School VLAG as a whole and Chapter 4 elaborates on the performances of its individual Chair groups / Research lines.

1.4 Quality of the information

The Committee was impressed by the quality of the information provided. In particular, the bibliometric data provided in each University was of great value in assessing the scientific quality of the various research groups.

The Self Assessment Reports were well structured, but the Review Committee did note that there was considerable difference in approach of presenting the data between NUTRIM Maastricht and VLAG Wageningen. The Committee recommends that either a single unified report or two reports of identical format be used in future reviews.

The SWOT analyses that were included proved to be very valuable and were an accurate reflection of all of the positive and negative attributes of each group.

The presentations during the site visit were in general well structured and the Committee appreciated the uniform approach that had been recommended by VLAG management.

The organisation of the interviews was very good. In general, it needs to be said that the arrangements, though excellently organised, were a little compromised at the last minute by some members of the Peer Review Committee changing their arrangements and not participating in the entirety of the review. This inevitably led to some difficulties in obtaining a unanimous assessment in certain areas. However, it must be stressed that this was outside the control of the VLAG Management.

Despite the foregoing, we believe that during the evaluation, the Review Committee was able to achieve a full and fair impression of the qualities, strengths and weaknesses of the VLAG Graduate School.

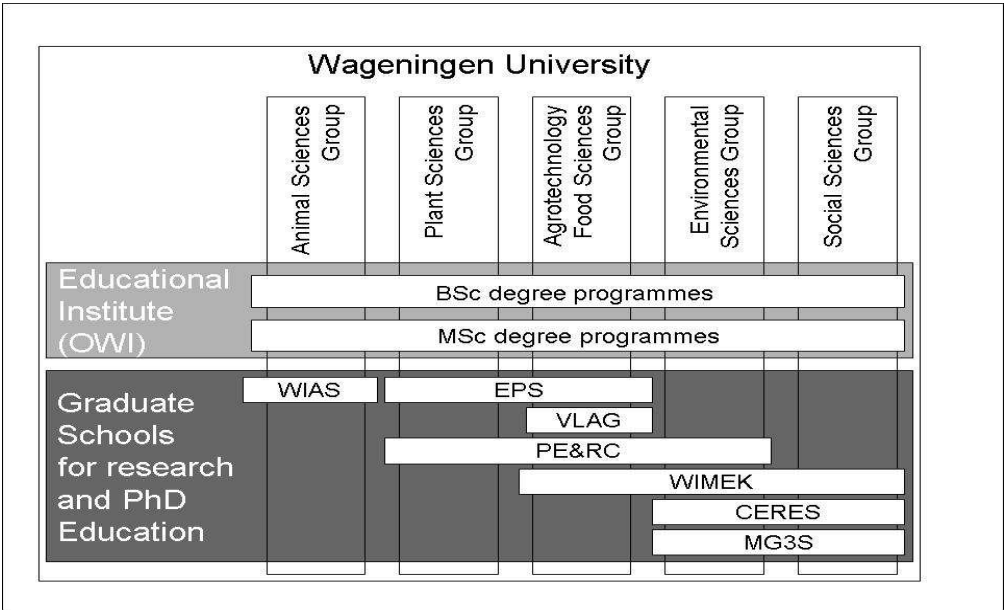
2. Structure, organisation and mission of the Graduate School

2.1 Organisational structure

VLAG is a national graduate school founded in 1993 to bring together the expertise in Food Technology, Agro-biotechnology, Nutrition, and Health Sciences. VLAG was established as a strong inter-university graduate school in these areas. Research groups from four Dutch universities (Wageningen, Maastricht since 1998, Nijmegen and Utrecht) and five research institutes (A&F and RIKILT from WUR, TNO – Quality of Life, NIZO food research, and RIVM-The National Institute for Public Health and the Environment) collaborate within VLAG. However, in recent years the concept of a graduate school as VLAG appeared not to match with the governance policy of Nijmegen and Utrecht University, so the formal collaboration came to an end. Nevertheless, at the level of individual scientists there is still collaboration. The administrative headquarter of the graduate school is at Wageningen University and Research Centre (Wageningen UR). This implies that Wageningen University is the leading partner providing financial resources to run the school.

Wageningen UR has been conceived and established as a leading international knowledge institute in the fields of nutrition and health; sustainable agricultural systems; environmental quality; and the processes of social change. Its corporate motto is ‘For Quality of Life’. It has been structured to build jointly on the CRO’s strength in strategic, applied and practical research for industry, government and other stakeholder groups, and on the University’s strength in fundamental and strategic research and the education and training of young researchers.

It encompasses five Sciences Groups: Plant Sciences; Animal Sciences; Agrotechnology and Food Sciences; Environmental Sciences; and Social Sciences. Within each Sciences Group a Department of the University of Wageningen and a number of the relevant Business Units of the Contact Research Organisation (formerly DLO-institutes) are linked. In this way it brings together a wide range of specialist facilities and expertise, on a multi-site basis, but under a management structure for research, operating within the Science Groups and providing an integrating framework for both the University Departments and the CRO. The Sciences Groups comprise a Wageningen University Department and a CRO Business Unit.



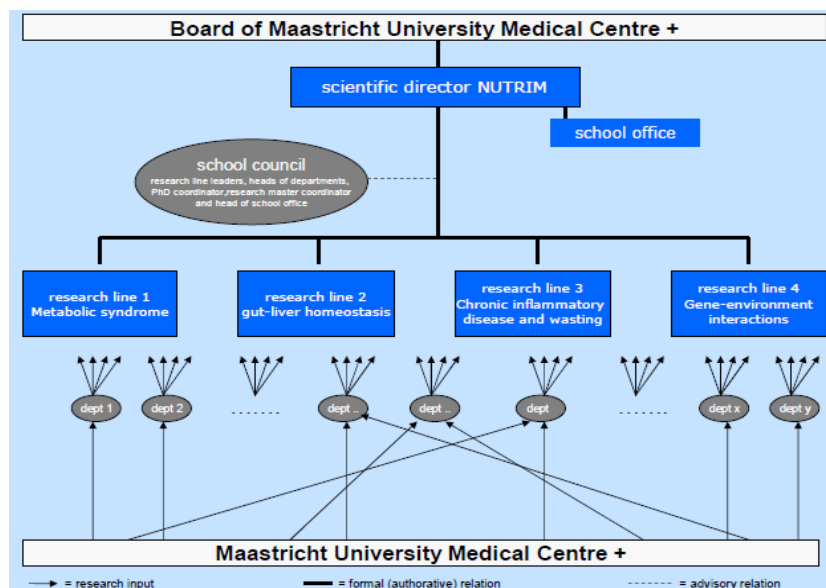
Within Wageningen University the basic unit is the Chair group led by a full professor who is appointed Chair holder. The 17 VLAG Chair groups of Wageningen University are all part of the Department of Agrotechnology and Food Sciences. The Chair holders interact with the management of the Agrotechnology and Food Sciences Group with regard to human resource management, financial management and facilities. They interact with the Graduate School VLAG with regard to the focus, direction and quality of their fundamental and strategic research and PhD program. Hence, the Chair groups are at the crossroads of the axes, meaning that Chair holders develop a strategy and policy towards their Chair in dialogue with both the Sciences Group and Graduate School.

VLAG is headed by a scientific director, appointed for the period of four years by the Rector of Wageningen University. The scientific director has the responsibility for the management of the research school, including the organization and management of the research programme, post-graduate training programme, financial management, and public relations of the school. VLAG has a coordinating office that manages financial and organizational issues.

NUTRIM is a research school within Maastricht University Medical Centre+ (MUMC+) and member of the National Graduate School VLAG since 1998. Maastricht University was founded in 1976 and is the youngest university of the Netherlands. Research at Maastricht University is characterized by a multidisciplinary and thematic research approach and problem based learning. The Faculty of Health, Medicine and Life sciences (FHML) is the largest faculty of Maastricht University. The FHML officially exists as of January 1st 2007 after a merger between the former faculties of Health Sciences and Medicine. The main reasons for this merger were a new vision of health and health care and the creation of an excellent partner for strategic educational and research alliances. In 2008 the FHML merged with the Academic Hospital Maastricht into MUMC+. The dean of the faculty is also vice Chair of the board of MUMC+.

Through a combination of biomedical, (clinical) applied, public health and primary care research, concentrated in five research schools, the FHML aims to strengthen the research and increase knowledge transfer by incorporation and implementation of the 'integrated care concept' within MUMC+. Therefore, the so-called ZKO's: chains for care, education/training and research have been introduced. In the thematic ZKO's the research and educational activities positioned within the schools and the academic patient care are combined and managed in an integrated fashion.

In the research schools masters' students, PhD students, and researchers work together. In addition to research, the schools are responsible for training researchers and providing masters-level education.



The research School NUTRIM is headed by a scientific director, who is appointed by the dean of the Faculty. The scientific director has the final responsibility for the management of the research school, including the organization and management of the research programme, training of the graduate and master students and the post-doctoral fellows, financial management, scientific output and public relations of the school. NUTRIM has a coordinating office that manages financial and organizational issues.

Research is structured in four research lines. Research line leaders coordinate and integrate research within their research line for which they receive an annual budget. This budget is based on the number of promotions in the recent past, The spending of the budget is explicitly earmarked for the sponsoring of PhD-positions but temporary alternative positions are possible when more appropriate for the research line.

The Management Team (MT) of NUTRIM consists of the scientific director (Chair person), the managing director and the research line leaders. The MT meets every month to address issues at the strategic and tactical level. The NUTRIM School council consists of the MT, heads of the departments that participate within NUTRIM, the Research Master coordinator and the PhD student coordinator. The council is entitled to advise the scientific director and meets at least four times a year. Annually the school has planning and control meetings with the department heads involved in NUTRIM, to evaluate research performance and discuss thematic and disciplinary developments.

2.2 Mission and research themes

VLAG operates under its mission:

“ The mission of the Graduate School VLAG is to develop the careers of young researchers and to promote research collaboration in Food Technology, Agro-Biotechnology, Nutrition, and Health Sciences.”

To assist in the creation of a coherent research programme, the research projects being undertaken in the School have been focused around four themes under which the Chair groups / Research lines conduct their research.

- Sustainable production
Major contributing groups: Food process engineering, Bioprocess engineering, Microbiology, Biochemistry, Physical & Colloid Chemistry, Organic Chemistry (all WU)
- Product and ingredient structuring and functionality
Major contributing groups: Food Chemistry, Food Physics, Product Design & Quality Management (all WU)
- Food safety
Major contributing groups: Toxicology (both WU and NUTRIM/UM), Food Microbiology (WU), Microbiology (WU)
- Nutrition, metabolism and health
Major contributing groups: Nutrition & Health, Nutrition & Epidemiology, Nutrition, Metabolism and Genomics (all WU), all NUTRIM/UM groups.

2.3 Responsibilities, governance and funding

VLAG's main responsibilities as a Graduate School are to:

- coordinate and develop post-graduate education;
- safeguard and stimulate the quality of academic research by PhD students, post-doctoral staff and academic staff;
- stimulate the development of a coherent academic research programme within its mission; and

- monitor the quality and progress of the research programmes.

Reflecting this role the Graduate School has several distinctive features, and its governance and organisation are subject to a number of interrelated structures and influences operating at different levels.

- Governance responsibilities at the Graduate School level rest with the VLAG Board and the VLAG Management Team; advice to this unit is provided from different groups of stakeholders.

VLAG Governance structure

Providing Advice	Decision making	Execution
VLAG International Advisory Board VLAG Contact Persons VLAG PhD Council External peers	VLAG Board & VLAG Management Team	Scientific Director Managing Director Programme Coordinator Education coordinators

- *The VLAG Board* is the decision-making authority for the school's performance. This includes appointing the Scientific Director, and approving the long-term strategy and planning and, more specifically, to take decisions about the main research and education goals, coordination and issues related to safeguarding the quality of these two core activities. The Board meets in principle once a year. Scientific directors of VLAG and NUTRIM and a representative of VLAG PhD council participate in these meetings as advisors.
- *The International Advisory Board (IAB)*, consisting of four international experts, provides advice on strategic issues concerning the prioritizing and quality of the research- and educational programme, and help to identify opportunities for academic and professional alliances. The IAB normally meets once a year, but on special occasions (e.g. midterm and external peer review) additional meetings are inserted.
- *The VLAG Management Team (MT)* meets every two months. The key task is to implement the research and education strategy and resulting portfolio. Besides advising on the planning of various research and training activities MT decides about the allocation of the university funds (core funding) to PhD and postdoctoral projects.
- *The VLAG Contact Persons group* is an informal information exchange platform formed by 23 representatives of all participating research groups and institutes, which meets three times a year. The Contact Persons advise on appropriate ways of engaging in various activities. Scientific director, Managing director, Programme coordinator and a representative of VLAG PhD council participate in these meetings.
- *The VLAG PhD council* deals with issues related to the position of the PhD students. The Chair person of the PhD council participates in the meetings of VLAG Board and VLAG Contact Persons.
- VLAG staff members are responsible for organising educational activities and student matters .
- VLAG has 2 PhD Student Confidants, one in Wageningen and one in Maastricht to which individual students may refer on any problems which they cannot solve themselves with their supervisors.
- Under the law of The Netherlands the Professor holding the Chair in each Chair group has a responsibility for the disciplinary development of research and education within the Chair group; in the development of Wageningen University's 5-year 'Chair Plan' and in decisions on the scientific interests of Chair appointments / replacements, the advice of the Graduate School is taken into account.
- The allocation of funding and resources to the research groups is according to an output based model, with the University Wageningen UR providing core funding for undergraduate teaching and research activities, and additional research funding being

gained on a competitive basis from public organisations such as NWO, the European Union and other bodies, and from contract research.

- Funding of the Graduate school itself comprises 4 elements: Staff (including scientific director), Organisation of PhD-courses, Research projects / core funding, International exchanges / activities.

2.4 VLAG Research organization and input

The research groups mentioned in the table below participated in this VLAG review. Please note that the organisational structure mentioned here is not the organisation structure of VLAG, but of the participating universities.

Wageningen University – Chair groups Department Agro-Technology & Food Sciences
<p><u>Cluster Nutrition Sciences:</u></p> <ul style="list-style-type: none"> - Nutrition & Health, Prof. F. Kok - Nutrition & Epidemiology, Prof. P. van 't Veer - Nutrition, Metabolism & Genomics including Nutrition & Pharmacology, Prof. M. Muller & Prof. R. Witkamp - Toxicology, Prof. I. Rietjens <p><u>Cluster Food Sciences:</u></p> <ul style="list-style-type: none"> - Food Microbiology, Prof. M. Zwietering - Food Physics, Prof. E. van der Linden - Food Chemistry, Prof. H. Gruppen - Food Process Engineering, Prof. R. Boom - Product Design and Quality management, Prof. T. van Boekel <p><u>Cluster Bio-based Sciences:</u></p> <ul style="list-style-type: none"> - Valorisation of Plant production chains (not a formal university Chair group), Prof. J. Sanders - Bioprocess Engineering, Prof. R. Wijffels <p><u>Cluster Bio-molecular Sciences:</u></p> <ul style="list-style-type: none"> - Physical Chemistry and Colloid Sciences, Prof. M. Cohen Stuart - Organic Chemistry, Prof. H. Zuilhof - Biochemistry, Prof. S. de Vries - Microbiology, Prof. W. de Vos
Maastricht University - Faculty of Health, Medicine & Life Sciences NUTRIM - School for Nutrition, Toxicology & Metabolism
<p><u>Research Line 1: Metabolic syndrome (Prof. R.P. Mensink)</u></p> <ul style="list-style-type: none"> - Programme 1: Energy balance and obesity - Programme 2: Diabetes and cardiovascular disease risk <p><u>Research Line 2: Gut-liver homeostasis (Prof. A.A.M. Masclee)</u></p> <ul style="list-style-type: none"> - Programme 1: Gut-liver metabolism - Programme 2: Intestinal integrity and defence <p><u>Research Line 3: Chronic inflammatory disease and wasting (prof. E.F.M. Wouters)</u></p> <ul style="list-style-type: none"> - Programme 1: Inflammation and oxidant-antioxidant networks - Programme 2: Skeletal muscle weakness in ageing and disease <p><u>Research Line 4: Gene-environment interactions (Prof. F.J. van Schoten)</u></p> <ul style="list-style-type: none"> - Programme 1: Disease susceptibility - Programme 2: Toxicogenomics <p>Departments: Anatomy & Embryology, Clinical Chemistry, Epidemiology, Genetics & Cell, Biology, Health Promotion & Education, Health Risk Analysis & Toxicology, Human Biology, Imaging, Internal Medicine, Movement Sciences, Ophthalmology, Paediatrics, Pharmacology & Toxicology, Respiratory Medicine, Surgery (incl. Plastic Surgery)</p>

The research input of these two main partners in VLAG is given in the tables below, in which staff with permanent appointment is indicated as “tenured”. Total input for Wageningen and Maastricht combined is around 128 fte.

Table 2.4.1 Research input at institutional level – VLAG/WU (in Fte)

	2003	2004	2005	2006	2007	2008	Average
Tenured staff	37.0	36.0	35.6	33.4	32.4	31.7	34.4 Fte
Non-tenured staff	21.3	26.8	32.5	32.7	35.9	34.4	30.6 Fte
Total research staff	58.3	62.8	68.1	66.1	68.3	66.1	65.0 Fte

Table 2.4.2 Research input at institutional level – VLAG/NUTRIM (in Fte)

	2003	2004	2005	2006	2007	2008	Average
Tenured staff	38.4	35.0	34.6	34.0	36.6	36.3	35.8
Non-tenured staff	18.3	23.0	26.7	30.5	34.1	31.2	27.3
Total research staff	56.7	58	61.3	64.5	70.7	67.5	63.1

The personnel of the VLAG Graduate School comprise a combination of tenured academic staff, postdoctoral researchers and non-tenured academic staff, PhD students holding contract based appointments or other-types of appointments (such as fellowships from overseas), and support staff.

For Wageningen on an fte basis (i.e. taking account of the staff time spent on research) there was quite an increase in non-tenured staff and PhD students (especially employed and sandwich PhD students; Table 2.4.4) over the review period, whereas the number of tenured staff was declining over this period. Overall the Graduate School showed an increase in research staffing compared to the previous period.

Table 2.4.3 Total Number and type of PhD students inflow for VLAG total

	2003	2004	2005	2006	2007	2008	Average
1. Employed PhD students	68	61	81	67	74	91	74
2. Sandwich PhD students	7	5	0	9	14	9	7
3. Guest PhD students	1	4	3	5	1	2	3
4. External PhD students	3	1	1	3	4	2	2
5. Research staff as PhD candidate	2	0	2	0	0	0	0
Total inflow	81	71	87	84	93	104	86

Table 2.4.4 Number and type of PhD students inflow for VLAG Wageningen

	2003	2004	2005	2006	2007	2008	Average
1. Employed PhD students	41	44	45	40	42	69	47
2. Sandwich PhD students	7	5	0	9	14	9	7
3. Guest PhD students	1	4	3	5	1	2	3
4. External PhD students	1	1	1	3	4	2	2
5. Research staff as PhD candidate	0	0	2	0	0	0	0
Total inflow	50	54	51	57	62	82	59

Table 2.4.5 Number and type of PhD students inflow for VLAG NUTRIM

	2003	2004	2005	2006	2007	2008	Average previous 6 year period
1. Employed PhD students	25	17	36	27	31	22	27
4. External PhD students	1	0	0	0	0	0	0
5. Research staff as PhD candidate	2	0	0	0	0	0	0
Total inflow	28	17	36	27	31	22	27

2.5 Supervision and training of PhD students

In principle a PhD study at Maastricht and Wageningen University lasts four years; at least 75% of this time is devoted to the research project leading to the PhD thesis, the remaining 15-25% is directed to an education and training programme, tailor made to meet the needs of the individual student. To ensure the quality of the PhD programme VLAG has instituted a number of specific operational and management provisions:

Quality control of PhD research

- Each project proposal that results in appointment of regular PhD student with an appointment or a sandwich PhD student is reviewed before appointment takes place. If no review has been done by the granting agency then the graduate school performs the review by sending the proposal to two independent reviewers that assess the proposal on; i. scientific quality and ii. feasibility.
- Most employed PhD students are selected by a normal job application (category 1 as described in section 5.2). Students that fall under categories 2 and 4 and who do not have a Dutch MSc degree have to apply for admission to the PhD study. This process might imply an assessment of the foreign degree. An English language test is part of the admission procedure.
- After 12 – 18 months a go/no-go decision is taken based on a formal evaluation of the performance during the first year. This system was introduced mid 2007, in practice this evaluation rarely leads to the PhD research of being stopped (1-2 cases per year).
- The supervisor will ensure that if necessary the necessary approval of the University Committee on Animal Experiments and of the Medical-ethical Committee of University Committee is obtained.
- Students are strongly advised to start as soon as possible to publish their work in refereed journals, this process of peer review contributes to the quality awareness of young researchers

Education and training of PhD students

- Within 3 months after the start of the project the PhD student submits the Training & Supervision Plan (TSP). This TSP is signed by the student and the supervisor(s) and outlines the education activities that are planned. Normally the formal evaluation after year 1 and/or year 2 result in a modified TSP.
- The graduate schools offers a VLAG lunch each 2-3 months to discuss with new PhD students how to draft a TSP.
- The TSP must comprise a minimum of 30 ECTS according to the following breakdown;
 - Discipline specific activities (courses, workshops, symposia)
 - General courses (PhD-week, statistics, language courses other skills courses, ethics)
 - Optional activities (MSc courses, PhD excursions, journal clubs)For the discipline specific courses the students are encouraged to take courses outside the regular VLAG programme, the relevant courses offered by other organizations are presented at the VLAG website.
For the general courses the VLAG PhD-week is a compulsory element.
- A few months before graduation the student submits the completed curriculum to the VLAG secretariat for approval. The VLAG education certificate is awarded at the official graduation. A summary of the completed training activities is included in the thesis.

3. Performance of the Graduate School

3.1 The identity of the institute and the mission statement

Identity

The Review Committee assessed a significant amount of written information during the review and conducted interviews with all Chairs at Wageningen and all research lines at Maastricht as well as with a small selection of PhD students and research institute representatives. In general, it was felt that VLAG had a strong identity amongst the staff and students at Wageningen and there was good staff engagement with its mission and good correspondence between its research themes and those of the individual Chairs / Research lines. The Committee was unable to make a similar assessment of the identity at Maastricht as there was less time there for the interactions.

Mission statement VLAG Wageningen:

“The mission of the Graduate School VLAG is to develop the careers of young researchers and promoting research collaboration in Food Technology, Agro-Biotechnology, Nutrition and Health Sciences area.”

Mission statement VLAG NUTRIM, Maastricht:

“NUTRIM catalyzes translational research into metabolic and chronic inflammatory disorders (i.e metabolic syndrome/diabetes, IBD/intestinal failure and COPD) that will contribute to innovative personalized lifestyle and medicine approaches with a focus on nutrition, toxicology and metabolism. Through its research master and PhD programme NUTRIM aims to produce investigators of high scientific excellence and ambassadors to support and develop this research field.”

The above VLAG and NUTRIM mission statements are broad enough to allow all stakeholders to adhere to their principles. The assessment group realises that these have been refined continuously over recent years, but are of the view that they are now in an excellent state and ones with which all stakeholders can identify.

Of course, the internal structure is different at the two universities but the Committee considers that there is no need for uniformity as the main virtues of having a joint graduate school, namely, ensuring excellence in its research, increasing the education and training opportunities for students at both universities and promoting inter-university joint research is, in general, being met.

3.2 Management and Leadership

VLAG represents a unique academic community in The Netherlands in research and doctoral education in the areas of food technology, agro-biotechnology, nutrition and health. It now involves Wageningen University and Maastricht University with intensive research collaborations from a range of Dutch research institutes.

VLAG operates in an organizationally complex environment. The universities involved consist of several hierarchical units with a variety of nomenclatures (e.g. science groups, departments, clusters, Chair groups, research lines, etc). This is confusing to outsiders. This Review Committee suggests simplifying the nomenclature and (?) the roles that the different stakeholders involved in the functioning of VLAG have had in the past. The goal is to come up with a simpler, streamlined and coherent administrative diagram describing the specific roles and interrelations between the different bodies participating in VLAG. The experience

gained by VLAG in the past 15 years of operation provides an opportunity for reviewing managerial procedures and strengthening key roles.

Chair groups / Research lines are at the center of VLAG's activities. The VLAG management team has a limited role, particularly since most of the operational funding of the Chairs comes from the respective universities or outside sources. The Review Committee finds it commendable therefore that the management of VLAG does add significant value to the graduate program by stimulating strategic research, promoting interdisciplinary work, funding selected PhDs and postdoctoral projects, and promoting and funding specific courses and international scientific exchanges.

It was apparent to the Committee that major stakeholders of VLAG (e.g. Chairs, researchers and students) were satisfied with the performance of the management and the leadership provided by the program during the review period.

NUTRIM has a clearly defined management structure. It was clear to the Committee that NUTRIM is energetically and effectively managed. The Management Team, which consists of the scientific director, the managing director and the research line leaders, meet every month to decide issues of policy at the strategic and tactical levels. It is also clear that the management policy at Maastricht differs from that at Wageningen, in that the four research line leaders receive greater guidance as to content and research activities from the Director. This approach is appropriate given the more focused biomedical environment at Maastricht, and is evidently effective.

3.3 Strategy and Policy

A main part of the overall strategy for the graduate school is to stimulate and promote interdisciplinary and collaborative research in key areas of Nutrition, Food Technology, and Agrobiotechnology. As such the programme is generating highly skilled post graduates in areas of socioeconomic importance including Biotechnology, Food Safety and Nutrition. In this way, VLAG serves a National mandate in training people for a knowledge-based Agri-Food Bio-economy. The panel members were highly impressed with the increased level of National funding available for research in these areas and the consequent increase in the numbers and quality of the post-graduates which have emanated from the programme. The general quality aspect is evident at a number of levels including impact and number of publications and the state of the art technologies employed. At Wageningen, the graduate school itself describes its programme areas in four very broad terms within which the Chair groups can apply further specialization. In this respect, it would be useful to provide a diagram demonstrating the programmatic strategy and perhaps indicating priority levels in terms of core funding that might be provided by VLAG. Of course, these priorities would change with changes in the National requirements for highly skilled people to serve in the food industry.

Also at Wageningen the graduate school should be involved and give advice on any integration of different Chair groups into the four major AFSG research clusters. Indeed, the cluster structure might even be reviewed if a better model for research integration can be identified. The composition and positioning of these will undoubtedly affect the direction and interdisciplinary nature of the research and hence the research direction.

VLAG should also give careful consideration to the increase in funding coming from large National Programme consortia and research initiatives and particularly ones which have a significant public/private interface. In addition, funding for VLAG studentships may come directly from industrial sources. While realizing that the focus of post-graduate associated

research should be in the pre-competitive arena, the Sciences Group AFSG will need to seek expert advice on best-practice for handling intellectual property issues. Thus the Sciences Group's intention "not to have an explicit policy on intellectual property matters" may need to be revisited particularly in areas of applied research. In addition, the Sciences Group should have some statement on conflicts of interest relating to IP. Consequently, the Sciences Group might benefit from particular advice from institutions with expertise¹ in handling intellectual property issues such as the University of Leiden or the Erasmus University in Rotterdam and/or the applied research institutes.

NUTRIM has established a clear strategic framework designed to deliver high quality translational research in areas where its own skill-base and established international reputation can be brought into alignment with the research activities of other VLAG partners based in the University of Wageningen. Close collaboration between clinicians and biomedical researchers based in NUTRIM with primarily non-medical scientists specialising in food sciences and nutrition undoubtedly adds strength and critical mass to the overall national research effort in these areas, and contributes significantly to the internationally competitive position of The Netherlands. The research niche that NUTRIM has identified and fostered lies in the general area of human nutrition and metabolism, with a particular emphasis on the respiratory and muscular system and the alimentary tract. This general research focus is organised and managed as four separate but complementary research lines: 1. The Metabolic Syndrome, 2. Gut Liver Homeostasis, 3. Chronic Inflammatory Disease and Wasting and 4. Gene-Environment Interactions. The evaluation committee was generally convinced by the appropriateness of these groupings, which provide both critical mass and coherence. The research lines also provide an effective framework for further collaborations, both within The Netherlands (e.g. in Technological Top-Institutes TIFN, TI Pharma, CTMM) and in European collaborative networks (e.g. NuGo).

The evaluation committee strongly endorses the general strategic aims of NUTRIM within VLAG and recommends that existing links between research groups based in Maastricht and Wageningen should be strengthened. For example there appears to be considerable scope for closer collaboration between Research Line 2 and the Nutrition and Epidemiology group at Wageningen. Similarly, the committee supports the intention of the Nutrigenomics Consortium to develop translational research in the field of toxicology and risk assessment.

3.4 Research staff

The overall quality of the scientific performance of the research staff is seen as impressive by the Review Committee. Several individual scientists are competing at top international levels within their respective fields. The Committee noted that there is an ongoing assessment of the scientific performance of both individual scientists and the Chair groups. The Committee supports this strategy and recommends its continuation.

¹ With respect to IP and technology transfer, this is an area that has been evolving at Dutch universities since the mid-80's. The ministries of Economic Affairs (EZ) and Science and Research (OCW) as well as the Netherlands Science Foundation (NWO) have all been engaged in developing standard approaches and best practices with respect to patents and licensing, with more recent activities in this area by the Netherlands Genomics Initiative (NGI) and some of the new Technological TOP institutes. As a result of these efforts, effective patent and licensing procedures have been developing in Rotterdam, Leiden and Utrecht, which has supported and stimulated effective and profitable tech transfer and company creation at these institutions. Thus, sources of best practices in this area are emerging, and VLAG and Wageningen could profit from adopting these.

The Committee notes some staffing problems. Due to the limited number of tenured positions becoming free the competition for these is generally tough. On the other hand, in the more practically oriented disciplines, suitable candidates can choose from several good job offers, and here the situation is therefore reversed.

At the same time many post doc positions are filled from the in-house PhD programmes. Later in the career stronger performance criteria are in place, often linked to the annual performance and development talks and the tenured track system. This assessment is to be based on the achievements and esteem of the individual in house as well as in the broader setting. The Committee recommends that the outcome of the annual performance and development talks is included in career planning for the individual staff member.

The Committee stresses the importance of a clear international perspective and outlook in the research performed by staff and this criterion was generally fulfilled. The PhD programmes are well described. On the other hand the essential training and development of staff was not made clear to the Committee in the written documentation provided. Nor was there any evidence of how the outcomes such training and development procedures were used in management decisions either at the higher managerial level or within the research lines and individual Chair groups.

The Committee recognizes that while some research groups are formulating necessary succession plans for tenured staff members, the existence of an overall staff plan for VLAG was not apparent to the committee members. Small groups are especially vulnerable to the loss of key personnel and therefore ad hoc succession plans always need to be in mind.

The Committee especially noted:

- that there is little, if any, international representation in the tenured staff at Wageningen while Maastricht has a better 20% representation;
- that the predominately male tenured staffing could be indicative of an absence of an equal opportunity policy;
- that, while both universities have introduced tenured track policies for postdoctoral researchers financial constraints would seem to limit the speed with which these can be implemented;
- the Committee notes that in certain disciplines where there is a high external demand for staff with these disciplinary skills, nothing less than tenured positions will be attractive to candidates of high ability. We recommend that the staff plan should offer possibilities for the groups to acquire the right people, even if it would imply offering permanent positions at the moment of employment.

The Committee recommends that these issues be addressed.

3.5. Resources, funding, and facilities

The management and organizational structure of VLAG is seen as flat and efficient. The resources are in a range typical for such a large graduate program on a European scale. The Review Committee supports the management's philosophy of devoting a significant portion of its budget to supporting the research mission through funding of some PhDs in annual or biannual open competitions, with the remainder applied to incentivizing staff to deliver additional discipline education programmes. While the PhD funding through this central function represents only a small percentage of the total research funding, its use in promoting new interdisciplinary initiatives is supported by the reviewers.

By most international standards, the facilities at Wageningen are excellent despite the delays in accommodating all groups on the new campus. Many Chair groups identified re-housing to a single building as something that would enhance co-operation between Chairs and improve

competitiveness. The Committee noted the re-housing plans but regard this as an internal management issue.

Most Chair groups are well funded by external agencies and most build their equipment acquisition/replacement costs into their grant applications. We recommend that this should continue and that the concept continue to be promoted and nurtured by VLAG management. The overall number of tenured staff in VLAG Wageningen (either actual or FTE based) has not changed significantly over the review period but staff funded by external agencies has risen. The Committee has already noted this as a potential weakness in sustaining the excellence levels of the research outputs.

Total Funding (as measured by staff FTE) has also remained static in some groups, decreased slightly in four Chair groups and increased in seven. The consequence of this is that overall VLAG research capacity is up slightly.

3.6 Academic reputation

VLAG Wageningen:

The average number of PhD dissertations per fte and the number of peer reviewed publications as well as their impact indicate that output and the subsequent academic reputation of VLAG can be generally ranked as internationally competitive with several (as there are several 5-scores for productivity) research areas reaching world class levels. There is evidence of some variance in reputation within VLAG which seems to be linked to the state of development of a Chair group, its size and the Chairs leadership qualities.

However, VLAG overall has a significant international reputation and this is matched by that of most of its Chair groups and research lines, with the overall rating of VLAG, if scored as a single unit, being high. In addition, the existence of a sizable number of endowed Chairs within VLAG can also be regarded as another indicator for its high academic reputation.

The record concerning additional activities such as patents, industry contracts, (inter)national project participation and coordination, editorial activities, involvement in national and international boards and conferences, invitation for presentations or written contributions as well as attraction of international students provides good evidence of the individual engagement of VLAG tenured staff.

Consistent enhancement of the academic reputation of VLAG personnel and its associated institutions can be linked to the rigorous review and supervision of PhD projects, the requirement to obtain a research plan as well as completing 30 ECTS of courses during the four year contract period as well as the norm of four peer reviewed publications per PhD thesis. The systematic and periodic assessment of scientific merits of VLAG scientific staff, the periodic bibliometric analysis of VLAG publications and finally the PhD student's training and supervision plan all contribute to the impressive academic reputation of the VLAG Graduate School.

VLAG NUTRIM, Maastricht:

NUTRIM has a strong international academic reputation as indicated by the high citation indices and other bibliometric analyses. The bibliometric Hirsch-indices clearly demonstrated the high academic standing of tenured staff with a median score of 25 and the 75th percentile being 35 which indicates that NUTRIM is conducting world class research that is highly cited.

3.7 Scientific and social relevance

VLAG, through its origins in both Wageningen and Maastricht, has always had social and scientific relevance high on its list of priorities. As a university, Wageningen evolved from an

agricultural college through the Wageningen “Landbouw Hogeschool” to today’s university with practical and societal relevance as its early priority. Historically, it has seen the application of a solid set of fundamental scientific disciplines to agriculture production and processing problems together with the more recent integration of a series of research institutes into the university structure transform it not only into the first successful applied research and technology transfer organization in the Netherlands. In recent years, the integration of a series of research institutes into the university structure has now resulted in a research system that has matched its initial societal relevance with major scientific relevance. In further developing these dual objectives, the continued and essential input of the basic physical and biological sciences must not be overlooked.

That VLAG in Wageningen still maintains a range of basic sciences amongst its disciplinary mix is an indicator of this continuing scientific relevance, one which can be demonstrated through its excellent bibliometric data and, in particular, through its significant number of researchers with papers in both the top 10% and 1% most cited authors lists. The expansion of its expertise into human nutrition should be noted since collaboration with Maastricht University in the VLAG Graduate School will lead to further internal collaborations and joint initiatives, with additional impact with both scientific and social relevance.

Maastricht University has a strong focus on its medical school with a teaching approach that differs from that used by other Dutch medical schools. Human nutrition is one of its major research areas embedded in the Maastricht School for Nutrition, Toxicology and Metabolism (NUTRIM), now with strong links via VLAG to the Wageningen activities in the food and nutrition sectors. Research at NUTRIM is of major public health significance as metabolic syndrome is emerging as a major public health problem contributing to type 2 diabetes and cardiovascular disease. The research on inflammatory bowel disease and liver is also particularly relevant to clinical needs. The research on chronic inflammatory disease and wasting is particularly relevant to the ageing population and sarcopenia which is emerging as a major health issue associated with COPD and with age-related frailty. A particular strength is the translational aspects of the research which will improve clinical care and health of the general population.

The work in human nutrition is highly relevant and is applied to major public health problems in developing and developed countries and has an excellent track record in undertaking intervention studies with outputs that have directly influenced public policy. Consequently, NUTRIM enhances not only the overall scientific goals of VLAG but also contributes significantly to its social relevance.

An additional factor demonstrating social relevance of the scientific work of VLAG is the uptake of IP apparent across many of VLAG’s scientific disciplines. It is for this reason that the Committee emphasizes that the well accepted metrics for scientific excellence be supplemented, where relevant, by those of societal relevance so that the historically developed goals of both scientific and social relevance be maintained for VLAG’s activities.

3.8 The primary processes

3.8.1 Research

Metrics – general comments

VLAG has systems in place to review its research quality through external peer review and through its International Advisory Board. There is also a regular analysis of bibliometric data prepared for the management and Chair groups / Research lines at each university. Different calculation mechanisms in each university make comparisons difficult. However, the self assessment exercise associated with these reviews and the implied critical self analysis is

regarded by the Review Committee as excellent. All groups are considered competitive both nationally and internationally by the major VLAG stakeholders, their competitors and collaborators.

Scientific performance: Metrics – specific comments

VLAG attaches significant emphasis to normalised bibliometric data and assessment by peers during the visit. In general, Chair groups performed very well with scoring predominating in the 4 or 5 category. There were no scores of 2 or 1. In the case of two Chairs that were only in existence for part of the 6 year review period, it was felt that a productivity score covering the six years could not be allocated.

In the bibliometric analysis most groups scored well above the average for their discipline with just 3 being ranked below average for their discipline on the CI factor. A very creditable 3% of VLAG papers (77 papers) were in the top 1% group based on citations with 20% in the top 10% category. This clearly demonstrates the overall scientific excellence of VLAG. Even those Chair groups with CI scores below 0.8 had papers falling into the top cited categories.

Additionally, several groups had papers in the most highly ranked journals.

While such bibliometric data are being used increasingly worldwide, we recommend that VLAG reviews the most appropriate additional research quality assessment metrics to be applied to each Chair (e.g. patent take-up by industry, etc.) for there is a community specific value system which does not allow application of bibliometric indicators to all. Scientists publish and get cited, while engineers prefer to invent, patent, and receive money from industry. This makes a joint evaluation or value base very difficult.

Overall we consider that VLAG groups were performing very well in its core areas where both the quality and quantity of its outputs were well above the world average. Groups falling below this class tended to be slightly outside the core VLAG field of food and nutrition.

Internal collaboration

Internal collaboration was good but was rather 'ad hoc' and depended on the inter-personal relationships of the scientists involved and a recognition of the missing scientific skills required by the research of one of the partners. However, the Committee recognizes that while collaboration can be nurtured, it cannot be enforced, and recommend that VLAG continues with its policy of only funding interdisciplinary (inter-Chair group) PhDs through the limited graduate school finances. If means can be found to increase this PhD sponsorship, we recommend that the same philosophy should be continued.

External collaboration

External collaboration is very good both nationally and internationally but, of course depends on the relationships developed by individual scientists and their international reputations. The beneficial effects of the relationships between VLAG and the various national research institute stakeholders (e.g. TIFN) must be stressed. Also VLAG's cooperation with a few Scandinavian partners, which is focused on the joint development and use of PhD training programmes (and the team wise approach and collaboration in EU-projects, e.g. Marie Curie projects) is illustrative for VLAG's sense for the benefits of international collaboration. The Review Committee are impressed by the effects of these collaborations.

3.8.2 Training and education

The VLAG PhD training programme at the two universities and their national and international collaborating universities has much to recommend it, offering as it does a very high level of financial and intellectual support. The training programmes offer both advanced generic and discipline specific skills T-shape model). Uptake rates are very good, being up to

90% and increasing. We recommend that VLAG continues its policy of regularly increasing the range of discipline specific courses. We also recommend the implementation of any strategy to will ensure an almost 100% uptake of coursework credits for those PhD students for whom this is appropriate.

As this review was a research review, no assessment of the quality of the education programme was undertaken. However, we recommend that VLAG undertakes periodic reviews of the education programme quality.

The student experience

A number of students and the VLAG PhD Council were included in the meetings with the Review Committee. There was a general acceptance that the student experience at VLAG Wageningen was a very positive one with sufficient checks, balances and supports in place. No assessment was made at VLAG Maastricht due to time constraints on the visit. However, there is a presumption that it is equally positive as they participate in some courses of the VLAG course programme.

PhD Completion rates

The Review Committee was supportive of the procedures in place at VLAG such as the go/no go assessment process at the end of year 1. However, it was apparent from the data presented by each Chair group that the average completion time was in excess of 4 years. It would also appear that there was a small but significant drop-out rate. The Review Committee recommend that completion times and drop-out rates be examined and mechanisms put in place to reduce them.

3.9 Prospects and expectations for the graduate school

The Review Committee were pleased at the manner in which the recommendations of both the 2003 review and the later mid-term review have been implemented. PhD numbers are generally very satisfactory reflecting both the success rate of VLAG in attracting external funding and the reputation of VLAG in the food science & nutrition communities.

Nearly all Chair groups and research lines are strong by international standards. However, a number are rather small in tenured staff numbers. Especially for Wageningen greater visibility might be achieved through more focus on the VLAG research areas (Sustainable production, Product and Ingredient Structuring and Functionality, Food Safety and Nutrition, Metabolism and Health) rather than the individual Chair groups.

The future offers great prospects for VLAG once it can maintain and increase the level of external research funding. VLAG has the expertise range to participate in most areas across the food chain and is already benefiting from the changed relationships with the research institutes.

VLAG has in general an excellent staff cohort and while the risks outlined earlier may or may not be real, it will remain a very significant player in European food and nutrition research.

4 Reports on individual Chair groups / Research lines

The committee consisted of 14 experts in various areas relevant to the VLAG disciplines. Subcommittees of 3 – 5 experts were assembled for each of the Chair groups / Research lines to be evaluated. Each of the experts participated in 5 – 6 evaluations. The composition of the expert teams varied throughout the evaluation process to ensure that the evaluation standards were as uniform as possible.

Process of evaluation of single Chair groups and Research lines

Each evaluating subcommittee consisted of a Chair, a rapporteur, and 1-3 members. Before the interview, each of these experts formed a preliminary opinion of the group to be evaluated, based on the materials supplied by the Chair groups / Research lines. The meetings with the groups were opened with a brief summary of activities during the evaluation period, followed by a discussion about core activities of the group, scientific highlights, publications and impact, staffing, financing, relations to and with VLAG and other research groups, problems experienced during the evaluation period and future perspectives of the group. Available positions for tenured staff, changes expected in the next 5 to 10 years of significance for the viability of the group were also discussed.

Following the interview, the subcommittee discussed the information provided in the absence of the group, to establish a provisional set of scores for the four criteria Quality; Productivity; Relevance; and Vitality and Feasibility, as well as the reasoning behind each of the scores. The rapporteur formulated the text which was discussed by the subcommittee and modified as deemed necessary resulting in the final subcommittee report on the group.

It was almost always possible to draw clear conclusions and assign scores for each of the four criteria, based on the documents and interview with each of the groups. In two cases the information needed to score the productivity of a group was insufficient, because the group had been active for only part of the evaluation period, or other similar causes. In these two cases, no score was assigned for productivity, and this is indicated in Table 4.1. In both cases it was however possible to determine a score for other parameters, and these scores are listed as part of the group reports.

Results of evaluation of the complete set of VLAG Chair groups and Research lines

The individual Chair group / Research line reports were discussed in several plenary meetings of the entire committee to finalize the text and scores and to insure that the general evaluation procedures were comparable across all of VLAG. However the period covered by the assessment for the Research lines was different from the period covered by the assessment of the Chair groups (resp. 2007-2008 and 2003-2008).

The plenary evaluation was generally a straightforward process because there was significant overlap between the different subcommittees responsible for groups being compared. However, the need for the nutrition experts to spend some considerable time at Maastricht reduced the opportunity for complete harmonization with the food science and technology experts who were mostly active at Wageningen. The Committee recommends that the conduct of reviewing VLAG Maastricht and Wageningen simultaneously be reconsidered before its next iteration. Since this is an organisational rather a quality matter, suggestions will be made separately by the Review Committee Chairman to VLAG Management and the WU Rector Magnificus. However, despite this difficulty, the results as listed in the Chair group reports were approved by the entire committee.

Table 4.1. Summary of the scores for quality, productivity, relevance, and vitality and feasibility for the VLAG research groups

		Quality	Productivity	Relevance	Vitality
VLAG Wageningen Chair groups					
<i>Cluster Food Sciences</i>					
1	Food Chemistry	5	5	4	4
2	Food Microbiology	4	4	4	4
3	Food Process Engineering	4	4	5	5
4	Physics and Physical Chemistry of Foods	4	4	4	3
5	Product Design and Quality Management	4	4	5	4
<i>Cluster Bio-molecular Sciences</i>					
6	Biochemistry	5	4	3	3
7	Microbiology	5	5	5	5
8	Organic Chemistry	4	4	4	4
9	Physical Chemistry and Colloid Sciences	5	5	5	4
<i>Cluster Bio-based Sciences</i>					
10	Bioprocess Engineering	4	3	4	3
11	Valorisation of Plant Production Chains	4	ns	4	3
<i>Cluster Nutrition Sciences</i>					
12	Nutrition and Health	5	5	5	5
13	Nutrition and Epidemiology	5	5	5	5
14	Nutrition, Metabolism & Genomics	5	ns	5	5
15	Toxicology	5	4	5	5
NUTRIM Maastricht Research lines					
		Quality	Productivity	Relevance	Vitality
1	Research line 1 - Metabolic Syndrome	5	5	5	5
2	Research line 2 - Gut-liver Homeostasis	4	4	4	4
3	Research line 3 – Chronic Inflammatory Disease	5	4	5	5
4	Research line 4 – Gene-environment Interactions	4	4	4	5

ns – not scored

4.1 VLAG Wageningen Chair groups

Cluster Food Sciences

1. Food Chemistry

Current Chair holder: Prof. H. Gruppen
Average tenured research input: 1.7 fte
Tenured research input in 2008 1.8 fte

Assessment:	Scientific quality	5
	Productivity	5
	Relevance	4
	Vitality and feasibility	4

Quality

The mission of the group is to generate knowledge on the molecular properties, on biochemical modification and interaction of key food components. There is strong expertise on carbohydrate, protein, phytonutrient and analytical biochemistry. Mass spectrometry is very developed. The group has recently moved into quantitative fingerprinting of oligosaccharides and has re-entered the field of the embedment of carbohydrates in plant cell walls. In addition, the focus of the group was sharpened by abandoning activities in packaging and on volatiles, by choosing not to work on lipids, while including micronutrient research. It is of note that the group has a long and high quality history of carbohydrate research and raised the quality of its work by introducing hyphenated analytical techniques and giving increased attention to techno- and biofunctionality. As a result of its quality and status, the group attracts a wide variety of international PhD fellows.

Productivity

The productivity of the group is consistently high with a well balanced distribution of sources of funding (e.g. EU, TIFN, FND, CCC, etc.). Between 2003 and 2008, 42 PhD theses were completed and 287 publications in refereed journals were published. The productivity per research tenured FTE in terms of numbers of papers as well as PhD dissertations was much higher than the VLAG averages. For this reason, the committee considers the productivity as substantial and world leading.

Relevance

The group is actively involved and recognized for its work on oligo/polysaccharides and food derived peptides/proteins and their modifications.

Vitality / feasibility

The group has made a smooth transition from the former Chair of Professor A.G.J. Voragen to the current Chair. It has maintained its strength in its traditional areas of research and enriched it with new areas, especially with the field of quantitative fingerprinting. The rapid developments in analytical chemistry and the subsequent needs for continuous renewal of equipment increase the pressure to secure funds to be able to maintain frontline quality output and to remain competitive.

Cluster Food Sciences

2. Food Microbiology

Current Chair holder: Prof. M. H. Zwietering
Average tenured research input: 2.0 fte
Tenured research input in 2008 2.0 fte

Assessment:	Scientific quality	4
	Productivity	4
	Relevance	4
	Vitality and feasibility	4

Quality

The Food Microbiology group is a very impressive mix of fundamental systems biology research on pathogen and research on food quality and safety. The group also studies mixed population systems and biofilms and extends to risk management. The group is very well equipped and the relocating of it closer to food technology and processing expertise is to be welcomed. The group is quite well funded and reliant on programmes such as TI Food and Nutrition and it was thought that more advantage could be taken of European funding opportunities – a point that was made in the last assessment of the group. The group members are well known internationally and in particular the Chair for work on food safety control and Abee for functional genomics. The group has very good leadership with a clear vision for the future which combines classical food safety management and control research to state-of-the-art genomics of pathogens. These plans fit very well with the overall scientific vision for the University in that it starts at genetics and mechanisms and then applies them to the actual biological niches.

Productivity

The group has remained very productive in the last 6 years with an average of about 26 publications per annum. This was slightly down to 18 in 2008 which was explained as natural variation as the Chair and Abee have already published a number of papers in 2009. The group occupies a very nice position in food safety research which straddles systems biology and cellular responses right through to safety control systems. This is also reflected in the journals in which they publish – e.g. for the main part Abee publishes in journals such as Applied and Environmental Microbiology, Microbiology and Journal of Bacteriology which have impact factors of about 3-4 while the more applied work is published in appropriate destinations such as Journal of Food Protection and International Journal of Food Microbiology. What was particularly commendable was the enthusiasm by which they collaborate with each other as evidenced by co-authorship on numerous publications. In addition, the group also has very strong linkages to the Microbiology Group with which it has significant collaborations. The overall cohesion in the group was also very impressive. Moreover, it is clear that the group is producing very innovative results in areas such as risk assessment, fermentation and food pathogen molecular physiology.

Relevance

The group is involved in some key areas of relevance in food safety and particularly in the areas of risk assessment/control and stress responses in food pathogens. Moreover, the ambition to integrate functional genomics with food safety management and modelling is very commendable. The group has made significant scientific advances towards this end already as evidenced by some of their publications. The team has also built up good international networks and are frequently involved in various international panels including FAO, WHO, ILSI etc as well as being involved in national bodies.

Vitality / feasibility

The Chair group was seen to have a clear vision for the future which would integrate pathogen molecular physiology to food technology and risk assessment. This will be greatly facilitated by the future move of the group closer to other food technology researchers. A crucial part of this plan is the recruitment of retiring staff members to maintain the critical mass in the group. In addition, the group should also benefit from the new systems biology recruit which is presently being appointed. It is also commendable that the group did not prioritize mycotoxin research following the last peer review so that it could keep its focus on bacterial food pathogenic and spoilage bacteria. Taken together, all these considerations show a lot of vitality and potential for the group in the next five years.

Cluster Food Sciences

3. Food Process Engineering

Current Chair holder: Prof. R.M. Boom
Average tenured research input: 1.8 fte
Tenured research input in 2008 1.8 fte

Assessment:	Scientific quality	4
	Productivity	4
	Relevance	5
	Vitality and feasibility	5

Quality

The group's activity is centered around the development of novel processes for foods as opposed to more traditional food engineering groups which are mostly focused on optimizing traditional processes. The group is unique in that they consider the complexity of concentrated food systems as a challenge and opportunity rather than a drawback or limitation, and they try to exploit it in positive ways. Their approach is well defined and starts by analyzing practical situations, follows by understanding the basic mechanisms involved and building simulation models, and then moving into experimental verification of the model. In this respect, the leadership and vision provided by the Chair holder is clear and decisive. The scientific impact of their research has been slow to be recognized, probably because of the novelty of the approaches involved (few research groups worldwide), but it is improving fast.

Productivity

After the splitting of the two engineering groups, the number of permanent tenured staff has remained low giving rise to significant supervisory workloads. Although the number of scientific publications in the period 2003-2006 was rather low, there was a significant increase in number during 2007-2008. Seventeen PhD theses were finalized during the evaluation period and 7 patents filed which became actively used by industry. It may be that the novelty of the research topic and the sophistication of laboratory techniques involved are entry barriers precluding many actors in the subject, hence, the number of citations is lower than expected. Although there seems to have been no problems with the publication of research results so far despite the large industrial funding we feel there is a potential danger of friction and recommend appropriate alertness for this. A delay in publication beyond the 6 month period as established by the university contract, seems to be a fair engagement.

Relevance

The scientific relevance of the research is in the novelty and ample potential for application (as explained above). It is also demonstrated by the interest from the food industry to rapidly adopt most findings of the group and the multiple possibilities for funding from this sector. It is also relevant since it links foods to the potential of application of nanosciences. The societal relevance resides in the potential of FPE to uniquely provide better foods and processes that are also significantly more sustainable than the conventional ones. There is a very attractive window for the group to start interactions with the nutrition group(s) in VLAG and thus extend their approach to "food process engineering inside the body".

Vitality / feasibility

The group is in a strong position to grow and consolidate as a worldwide leader in their area due to their unique positioning in the intersection between (nano)-colloidal science and food process engineering. A flow of resources is foreseen enough to finance a group of 20-25

PhD students. It is remarkable that beyond his academic duties Prof. Boom participates or is member of the board of several scientific consortia (DSTI, Process-on-a-Chip, Netherlands Nano Initiative, NWO-ST, ISPT) that may prove to be important sources of ideas, teams and funding in the future.

Cluster Food Sciences

4. Physics and Physical Chemistry of Foods

Current Chair holder: Prof. E. Van der Linden
Average tenured research input: 1.9 fte
Tenured research input in 2008 1.8 fte

Assessment:	Scientific quality	4
	Productivity	4
	Relevance	4
	Vitality and feasibility	3

Quality

The quality of publications is excellent although an increase from the previous review was not perceived by the Committee. However, the review committee were satisfied with the scientific approaches undertaken and the conduct of the research which demonstrated very good quality in its chosen lines.

Productivity

The numbers of PhDs in the group seemed to be on the low side given that the nature of the research had such excellent potential and the presence of 4 faculty to supervise the work. Given this, level the output in terms of publications was very good. The low PhD and staff numbers seems to be associated with a perceived lack of leadership ambition. However, the committee accepts that this could be a personality/style issue during a short interview that masks the true intentions.

Relevance

This area continued to be good with very good RI and CI data over the period. This excellent citation record is taken by the reviewers as an indication of the relevance of the research lines.

Vitality / feasibility

The mission could be more visionary and the ambition gave cause for concern. The earning capabilities of the Chair could be improved and the leadership could be enhanced by more visionary strength.

There seemed to be a lack of strategic planning and ambition for the activities of the group. Strategic planning of the group seems to develop along previous strongholds, only the ambition to move to or to develop new attractive projects in Physics and Physical Chemistry of Food seems to be restricted. The Chair should be encouraged to start such "seeding" operations, presumably coming with a non project bound PhD-funding by the school.

There seemed to be an acceptance that the level of tenured and non-tenured research staff was adequate.

The Assistant Professors agreed that this was an excellent place to carry out their work. The Chair thought that resources were not too bad. Access to research facilities was said to be good and, for example, the level of microscopy available was satisfactory.

Cluster Food Sciences

5. Product Design and Quality Management

Current Chair holder: Prof. M.A.J.S. van Boekel
Average tenured research input: 2.4 fte
Tenured research input in 2008: 3.1 fte

Assessment:	Scientific quality	4
	Productivity	4
	Relevance	5
	Vitality and feasibility	4

Quality

The group is particularly renowned worldwide by its integrative approach to the assessment, quantification and management of food quality, as well as by the mathematical modelling of food quality (particularly of specific food components). Since food quality can be a broad and sometimes vague subject, the group has uniquely succeeded in concentrating in a few research lines and developing meaningful relationships with other Chairs within VLAG. They have a clear view of the goals to be achieved in mathematical modelling, including the application of some advanced techniques, but to this committee the contribution to quality management is somewhat basic and diffuse. They have responded to concerns by previous reviews about broadness of scope by conceptualizing their research subject as QACCP: Quality Analysis Critical Control Point, which expands on the well known HACCP acronym of food microbiology. This reflects the fact that, in general, food quality attributes ought to be controlled and measured along the food chain, and managerial decisions taken accordingly (implying that microbiological safety is only a necessary but not the only condition for food acceptability).

Productivity

The group has achieved a good critical mass (1 full professor, 2 associate professors, 7 assistant professors and on average 2 extraordinary Chairs). In the period of the evaluation 22 PhDs have graduated. Bibliometric data show that the CI and RI indexes of the PDQ group in the area of Agricultural Sciences are well above the world average and have risen continuously in the period. However, the number of papers per year has remained almost constant while the number of papers in the top 1% is above the average for the graduate school as a whole. A textbook has recently come out by CRC Press/Taylor Francis which recollects research data and past educational experiences of the group on kinetic modelling of foods which will increase their international presence and impact.

Relevance

This group is of high relevance to the VLAG program for at least 2 reasons: First, their approach to connect disciplines within food science & technology and the market/consumer interface, thus fostering interdisciplinary research (about half of the PhD theses are in association with other Chairs) and explicitly adding a societal dimension to the program. Secondly, as food quality and safety become central to the European Food Platform it is likely that VLAG and PDQ will both derive incremental benefits. However, it must be said that the multidisciplinary nature of PDQ together with its management science and mathematical modelling dimensions makes it difficult to classify, compare and benchmark the group.

Vitality / feasibility

The group's ambition is to be a leader in academia in the scientific understanding of control of food quality. To this extent, they have implemented within the group a number of

stimulating initiatives to discuss developments and future planning. They think they have responded to the suggestion of VLAG external review (2003) to concentrate on specific fields, yet the mission of the PDQ group is to be at the interface between the basic sciences and topics related to the food matrix/product which is quite broad. In this respect they expect in the future to strengthen linkages with nutrition groups and those working on sustainability and consumer science. There appear to be ample international funding for quality aspects in foods. The name of the group, combine two concepts which are normally disciplines by themselves within food science (particularly in industry). This does not help in providing a clear and recognizable identity both at WUR and internationally. It is suggested that in order to overcome this ambiguity the name of the group be changed to one that reflects more properly their core subject, e.g., *Food Quality Modelling*.

Cluster Bio-molecular Sciences

6. Biochemistry

Current Chair holder: Prof. S.C. de Vries
Average tenured research input: 2.0 fte
Tenured research input in 2008 2.3 fte

Assessment:	Scientific quality	5
	Productivity	4
	Relevance	3
	Vitality and feasibility	3

Quality

Biochemistry in Wageningen has a long history with an initial focus on enzymology, enzyme structure and function, and fluorescence spectroscopy of proteins and protein ligands. More recently, under the current Chair holder, there has been a change towards plant signal transduction, using both fluorescence spectroscopy as well as additional analytical and biochemical options. The current research focus of the group is on:

- Signaling based formation of plant (root) stem cells (Weijers);
- Plant steroid receptors (de Vries);
- Proteomics/metabolomics, with both plant and human systems (Vervoort);
- Protein interactions in vivo, studied via in situ fluorescence spectroscopy (Borst)
- Protein folding in vivo and vitro (van Mierlo);
- Structure and function of redox enzymes, with applications in biocatalysis (van Berkel).

While the staffing of the Biochemistry has been primarily recruited from internal sources and gives rise to a rather inward looking staff history, the research of the laboratory has been excellent, with a solid stream of PhD theses and refereed papers.

Productivity

The productivity of the laboratory is very good, both with respect to PhD theses and refereed papers. The numbers per fte tenured staff are similar to those of the better performing groups in VLAG.

Relevance

The reviewers believe that the basic sciences continue to be essential to the functioning of a modern university such as Wageningen. It is fine to develop large research operations designed to address specific areas of significant societal relevance. However, it is imperative that the smaller, less visible areas that are at the basis of much of the applied work, be protected by the University. Not doing so creates the risk of long term losses which will not be easily repaired. While there is significant interaction between Biochemistry and other Chair groups, the interaction should continue to be fostered and enhanced for the overall benefit of VLAG. While the review team were given the impression that neither VLAG, nor the university leadership fully share the relevance of biochemistry and the need to maintain the biochemistry laboratory as a vital and core activity in Wageningen, we accept that this may be more individual perception than reality. Hence the score 3 above.

Vitality / feasibility

Despite the very good performance of the laboratory, both in terms of having a solid and reasonably coherent research focus, very good papers and significant external funding, one senses a distinct feeling among the Wageningen biochemists that within VLAG their efforts are not appreciated. Possible causes are that the biochemists are finding it difficult to recruit undergraduate and graduate students, and they have a perception, not necessarily borne out

by the statistics, that a growing number of their VLAG colleagues find it unnecessary to involve the Laboratory of Biochemistry in their projects, even when there is much to be gained from such collaborations. There are several positive exceptions: the microbiologists and colloid physicists still find biochemistry of interest and useful. To some extent the same is also true of the food chemists and toxicologists. Clearly, it is important that Wageningen has a strong Biochemistry laboratory, with a focus on fundamental questions that are of interest to other Wageningen groups, and prominent via its fundamental work on important open questions relating to subcellular macromolecular processes.

Having and maintaining biochemistry as a core discipline in Wageningen is, first of all, a task for the biochemists in Wageningen today. However, it is equally important that the VLAG top management fully shares this notion, with practical support as required. Most important, the leadership of WUR must keep biochemistry on its list of essential WUR disciplines and make its decisions for the development of the school accordingly.

Cluster Bio-molecular Sciences

7. Microbiology

Current Chair holder: Prof. W.M. de Vos
Average tenured research input: 3.3 fte
Tenured research input in 2008: 3.2 fte

Assessment:	Scientific quality	5
	Productivity	5
	Relevance	5
	Vitality and feasibility	5

Quality

The research at the Laboratory of Microbiology was considered to be of outstanding quality at a number of levels. The group uses genomics-based and systems biology-based approaches to study Bacterial Genetics, Molecular Ecology, Microbial Physiology and Fungal Research. The group has developed considerable critical mass in all these areas and together has the largest citations and publication output of any Chair. In addition, the recruitment of a Systems Biology expert to the group which will also take responsibility for Fungal Genomics will increase the already cohesive nature of the group. The group is also very well funded externally in both EU Framework and National programmes including three Technological Top Institutes and the Kluver Centre for genomics of Industrial Fermentations. The group has also built up an impressive array of external international collaborators which represent some leading researchers in for example gut microbial enzyme bioengineering. Many of the group members are undoubtedly world class based on their publication record, quality and quantity of their post-graduates and their recognition in terms of awards including the SPINOZA prize awarded to the group leader is clearly very impressive.

Productivity

The group has been remarkably productive in the last six years and in terms of education and training has generated a total of 44 Ph.D.s alone. The groups publication record is also very impressive generating an average of 70 publications per annum. Many of these are in very prestigious Journals such as Science, Nature, PNAS and Nature Rev. Microbiol. Moreover, the group has filed a total of 18 patent applications and generated three spin out companies. All these are evidence of a highly productive and well-organized group which are making significant scientific breakthroughs in various chosen fields of Molecular Microbiology.

Relevance

The group is applying state of the art genomic technologies to the study of microbial biochemistry, physiology and ecology. The group comprises 4 interdisciplinary research teams each having a leader and organized to give good synergy across the entire group. The group also has very strong linkages with the Food Microbiology group as evidenced by co-authored publications. Overall, the programme is highly relevant in that it forms part of many Centres of Excellence including the Kluver Centre and TI Food and Nutrition. It is also important to emphasize that the group has several new 7th Framework Projects including Meta-Hit, Promicrobe, Interplay (which they coordinate) and Solar (Marie Curie/coordinator).

Vitality / feasibility

The group is a very vibrant one with a clear plan for the future involving a genomics and systems biology approach to examine microbial interactions, biotransformations and their

control. It covers a broad expertise in gut bacteria, archea and fungi. Based on their past successes in terms of scientific breakthroughs, publications and very successful Ph.D. students the group will perform at the highest level and its leadership and vision for the future is extremely inspiring. It is also commendable that there has been a steady increase in the Ph.D. portfolio of the group in recent years as a direct result of increasing funding and international collaborations. The track records of the professors in the group is also excellent in terms of scientific publications, number of awards and attracting funding . In addition, there has been a lot of effort devoted to staff development with respect to sabbaticals, visiting professorships and serving on prestigious editorial boards.

Cluster Bio-molecular Sciences

8. Organic Chemistry

Current Chair holder: Prof. J.T Zuilhof
Average tenured research input: 2.4 fte
Tenured research input in 2008: 1.9 fte

Assessment:	Scientific quality	4
	Productivity	4
	Relevance	4
	Vitality and feasibility	4

Quality

The group continuously publishes a large number of papers in the top journals of chemistry which also find high relative impact (as expressed by citation analysis); in the duration to be evaluated no less than 40 paper were ranked top 10%, 9 of them even top 1%. This is among the very good groups in this field, internationally, with the option to improve even further.

It is to be said that the new Chair holder started in 2008 only so that the direct results of this measure are still to be expected and cannot show up in this reporting period.

The current topics are wisely chosen and bridge the world of fundamental basic organic chemistry with food and microtechnology safety monitoring issues coming from WU and VLAG.

The review committee recognizes that the equipment of the group is very good, and that it puts the group in a very favourable position to perform world class science along focused research lines.

Productivity

The productivity of this group is very high, as expressed in the number of papers, the number of grants attracted as well as a very large PhD-student body which is still increasing. This is very good, and the measures taken by the current Chair holder should be reflected in increased outputs over the coming years.

Relevance

Also the relevance of the topics chosen is very high and can make this group to a central stronghold of WU, especially in the areas Bionanotechnology (which is otherwise only covered at WU in Physical Chemistry); first growing activities are also to be seen in direction of the WU core topic "bio-based society". The publications are highly cited, and some of the inventions/patents of the group have been transferred to the industry and practical applications, with more in the pipeline to come (e.g. the work on the coating of microfilters). All this makes Organic Chemistry an essential partner with the VLAG school.

Vitality / feasibility

The group has nicely been refocused from a merger of two groups at the beginning of this decade. Two junior faculty members just have been appointed. The group gave the impression of a very active, vital and also interactive group on the rise, with the forthcoming topics however still to be found. Here we again have to state that the current Chair holder was employed at the end of the reporting period. This is why the evaluation committee assigns a "very good" for vitality, with the potential to develop excellence in the years to come.

Cluster Bio-molecular Sciences

9. Physical Chemistry and Colloid Science

Current Chair holder: Prof. M.A. Cohen Stuart
Average tenured research input: 3.6 fte
Tenured research input in 2008: 2.9 fte

Assessment:	Scientific quality	5
	Productivity	5
	Relevance	5
	Vitality and feasibility	4

Quality

This Chair continues to carry out world leading, innovative and outstanding research. The Chair has been recognised by a number of awards and has become the new Chair of the very successful journal *Soft Matter*. The Chair holds an impressive International position and reputation and continues to publish high impact and significant research. There is a clear increase in the bibliometric indicators as would be expected for such good quality work. This indicates an excellent management of the research being carried out.

Productivity

There is a clear stated strategy of only publishing excellence and the downgrading of lower impact material. This publication strategy is paying dividends as the Chair increases its International standing. An excellent level of PhD theses are being produced

Relevance

The group is addressing within its portfolio some of the key questions of food-related Physical Chemistry and Colloid Science, for instance in the qualitative understanding of coacervate layers, the behavior of vesicles, or the description of tethered polymer layers.

The group is to be seen in those areas as "Europe leading", and the knowledge is indeed requested to be transferred by industry and academia. This is for instance expressed by the contribution to some EU networks as well as a very large number of invited talks; the Chair is indeed a unifying figure in European colloid science and the Physical Chemistry of Food. Within the VLAG school, this is seen as credibility and visibility towards basic natural sciences and also relevant for education and cooperation issues.

Vitality / feasibility

Two new appointments are to be made at a junior level and the Chair holder will be replaced in the next 3-5 years. There was concern that emphasis should be placed on bringing outside expertise to the group.

In addition it is recommended to start the succession planning of the Chair leader immediately. It would be preferable if the successor is at least identified, if not actually in place, before the current holder retires. This area is obviously important to VLAG and thought needs to be made in continuing the excellent work. Research facilities are excellent.

Cluster Bio-based Sciences

10. Bioprocess Engineering

Current Chair holder: Prof. R.H. Wijffels
Average tenured research input: 2.1 fte
Tenured research input in 2008: 3.1 fte

Assessment:	Scientific quality	4
	Productivity	3
	Relevance	4
	Vitality and feasibility	3

Quality

The group has a solid reputation in bioprocess engineering, based on the past two decades under the leadership of Prof. Tramper who stepped down from the Chair holder position in 2007. The aim of Prof. Wijffels, the new Chair holder, is to develop new biotechnological processes for manufacturing of bulk chemicals and biofuels, biopharmaceuticals, biopesticides and healthy food ingredients.

The group has moved strongly into (especially since 2007) microalgae biomass production to be used as a source for chemicals and biofuels. The goal is to develop integrated product sets rather than isolating only individual components, so as to optimize the production stream from the algal biomass, and maximize the economic output of such algae based systems.

The group has used its expertise in algae cultures to drive a major new algae based production platform with significant funding by and involvement of Wetsus.

The group has a clear target in the above area and has become a significant player in the field, with very good cooperations at the national and international level.

Productivity

The productivity of the group was initially high (43 BPE publications in 2003) but dropped to 17 and 16 in 2005 and 2006 respectively due to the prolonged absence of Prof. Tramper for health reasons. The group is currently in a build-up phase with 27 and 20 publications in 2007 and 2008, respectively.

The number of PhD theses, refereed publications, and academic publications per FTE tenured research staff underwent a similar cycle. The quality of the journals used for publication such as Trends in Biotechnology, Appl. Environmental Microbiology, Appl. Microbiol. Biotechnology is high.

In addition, the number of PhD candidates has been increasing steadily since 2004 reaching a total of 20.5 FTE in 2008.

Relevance

The group is involved in the production of biofuels and bulk chemicals and is also aiming for sustainable and economically feasible production. There is increasing attention of national and international organizations and industries for biobased products and the subsequent need for bioconversion systems as well as for bioreactor design as executed by the group.

Vitality / feasibility

The group has faced significant problems in maintaining momentum and developing new initiatives during much of the evaluation period. The recently appointed new Chair holder has re-established clear goals for the future. The planned transfer to the projected new facilities will aid in improving operating conditions as well as collaboration within the group. At the same time, the steady growth of the algae research has resulted in workload distribution

issues within the group. In addition, the increasing demand for PhD students increases the pressure to develop and attract good candidates. All of the above indicates that significant efforts will have to be made to once again solidify the group and its future perspectives.

Cluster Bio-based Sciences

11. Valorisation of Plant Production Chains

Current Chair holder: Prof. J.P.M. Sanders
Average tenured research input: 1.1 fte
Tenured research input in 2008: 1.6 fte

Assessment:	Scientific quality	4
	Productivity	-
	Relevance	4
	Vitality and feasibility	3

Quality

The research of the group covers several aspects of the development of sustainable processes for the conversion of biomass into bulk chemicals, thereby replacing petrochemical feed stocks. The group is active along four lines: chemistry, fermentation, biorefinery, and chain analysis. The group today does not have the necessary critical mass in all of these areas. To avoid duplication of capabilities in the future, the committee recommends outsourcing experimental research internally to other VLAG research groups where possible.

The main strength of the group today is the execution of experimental projects based on desk feasibility studies. Experimental work carried out in the group would have to rely even more on the excellence present in other VLAG groups than presently the case if world leadership is to be developed and demonstrated.

Productivity

The committee realizes that the research group was only founded in 2003 and therefore chooses not to rate the aspect productivity. However, their quantity and quality indicators are moving in the right direction. Three PhD dissertations have been defended already. The group has applied for patents in six fields of which a patent in one has been granted. According to the interviewed members of the group, for five of them financial contributions have been obtained for maintenance or transfer to industrial partners

Relevance

The research of the group covers several aspects the development of sustainable processes for the conversion of biomass into bulk chemicals, thereby replacing petrochemical feed stocks. To develop sustainable processes for the conversion of biomass into bulk chemicals is a valid strategic option. The main strength of the group today is the execution of feasibility studies.

The group is active in an area that, in principle, is of high relevance. To develop sustainable processes for the conversion of biomass into bulk chemicals is a valid strategic option. However, the advancement and dissemination of knowledge aspects as well as the implementation of knowledge can be improved.

Vitality and feasibility

The group leader will retire within five years. Reflection is needed concerning the future embedding of the group and more specifically on the balance between in house feasibility studies and experimental research on the one hand, and drawing on expertise and infrastructure in other VLAG research groups on the other hand.

Cluster Nutrition Sciences

12. Human Nutrition: Nutrition and Health

Current Chair holder: Prof. F.J. Kok
Average tenured research input: 3.4 fte
Tenured research input in 2008: 3.3 fte

Assessment:	Scientific quality	5
	Productivity	5
	Relevance	5
	Vitality and feasibility	5

Division of Human Nutrition

Before going in to detail for each Chair group there was a brief presentation as to how the three Chair groups (nutrition and health, nutrition and epidemiology, and nutrition, metabolism and genomics) cooperate and worked together extremely well and effectively to strengthen the integration and cohesion of their work, linking cells, to individuals to populations. Each group lead at one level, but it was clear that there was genuine collaboration and cross- fertilization that strengthened each group.

Quality

There is a wide range of quality work undertaken with a strong track record in:

- undertaking large intervention studies of the effect of changes in aspects of diet on health (in widest sense including cognitive development) with excellent methods for assessing nutritional exposures;
- strength in international nutrition (only group in VLAG with this focus), particularly micronutrient nutrition;
- a growing strength on sensory research and evidence of wider collaboration to strengthen this work;
- important studies on undernutrition in the elderly- a trial showing benefits of improving the eating environment (sensory work) on nutritional status was strong and other work on the sensory side of work very interesting.

The overall breadth and depth of the research was impressive.

Productivity

There were a large number of PhD students. Publications were strong and above average for VLAG with CI of 1.78; 26% of outputs in top 10%. There was an average of 3 papers per year in very highly cited journals.

Relevance

The research was very relevant to major areas of public health and has an influence on policy in Europe and internationally. There was significant representation of the group at senior level in national organisations.

Vitality and Feasibility

This is an outstanding group which has been able to fund expansion of staff numbers. Funding for new Chair in micronutrient work has also attracted additional support, and appears to work well despite the Chair holder being only based in Wageningen part-time. There could be a more focused policy on strengths; some plans were perhaps over ambitious and there is a question as to whether they need to, for example, develop imaging work in house.

The lack of post doc opportunities may be restricting perspectives for excellent PhD graduates to be retained. The team noted in the report the continuing issue of delays in developing new housing and infrastructure.

There are opportunities to use food engineering to deliver foods with enhanced sensory and nutritional properties. More dialogue with involved science groups within VLAG would be desirable

Cluster Nutrition Sciences

13. Human Nutrition: Nutrition and Epidemiology

Current Chair holder: Prof. P. van 't Veer
Average tenured research input: 2.0 fte
Tenured research input in 2008: 2.3 fte

Assessment:	Scientific quality	5
	Productivity	5
	Relevance	5
	Vitality and feasibility	5

Division of Human Nutrition

Before going in to detail for each Chair group there was a brief presentation as to how the three Chair groups (nutrition and health, nutrition and epidemiology, and nutrition, metabolism and genomics) cooperate and worked together extremely well and effectively to strengthen the integration and cohesion of their work, linking cells, to individuals to populations. Each group lead at one level but it was clear that there was genuine collaboration and cross- fertilization that strengthened each group.

Quality

The overall focus of the group is on the aetiology and prevention of chronic diseases in a Western setting, and the group's strategy places a strong emphasis on three priority areas:

1. the assessment of nutrient exposure through the development and use of biomarkers;
2. overweight and micronutrient status;
3. nutritional factors influencing risk of cardiovascular disease and cancer.

Recent examples of successful studies in these areas were given, including an exploration of the role of folate status in the aetiology of colorectal neoplasia, and the effects of a Mediterranean diet on metabolic endpoints related to cardiovascular disease. There was good quantitative evidence of scientific impact. The CI of 1.91 was amongst the best in VLAG, and 25% of the papers were within the top 10% in the field.

Productivity

There was a consistently high output of papers in refereed journals (>20/fte/yr), PhD theses (2-3/fte/yr).

Relevance

The scientific relevance of the group, as judged from the impact of its papers and the extent and quality of its collaborations is clearly high. The committee strongly supported the existing collaborations with Community Health Services, and recommend that these should be strengthened, and it welcomed the possibility of extending the groups activities to incorporate elements of research relevant to food safety and risk assessment.

Vitality and Feasibility:

The group is relatively small, but the importance of collaboration, both within VLAG, and at the national and international levels is well recognised, and this enables the group to gain access to patient and population cohorts for study. Two members of the group have recently obtained personal Chairs, and Professor Kromhout was recently awarded a prestigious personal grant from the Netherlands Royal Academy of Arts and Sciences.

The group is strongly led and has a convincing forward strategy. The recent award to Professor Kromhout gives evidence of strength and international recognition, and will provide additional resources for the future. The only area where there was some uncertainty was in

relation to specialized statistical support for epidemiological research, which is limited within the group. The committee recommends that the strengthening of statistical expertise should be considered, either at the group or divisional level.

The Committee were impressed by the cohesion of the group, the evidence of strong leadership, the quality of the output and the obvious degree of international recognition. One of the group's characteristics is its ability to combine biological measurements with conventional epidemiological investigations, and it gains strength from its interactions with other specialists, both within the human nutrition division, and with more clinically orientated researchers at Maastricht. The committee felt that it would be valuable to strengthen the Maastricht interactions in the future, particularly in relation to studies on gastrointestinal disease, for which well-defined patient cohorts and tissue collections are available. The group expressed an intention to extend its future activities into the field of Public Health, mainly through collaboration with the Community Health Services, in order to assess the effectiveness of interventions aimed at specific health outcomes. It was recognised that although the expertise of the group is mainly in the field of nutrition, it would be necessary to develop an interest in other aspects of lifestyle, and to incorporate sociological and psychological methods in future studies.

Cluster Nutrition Sciences

14. Human Nutrition: Nutrition, Metabolism & Genomics

(including Nutrition & Pharmacology)

Current Chair holder: Prof. M.R. Müller and Prof. R.F. Witkamp
Average tenured research input: 2.1 fte
Tenured research input in 2008: 2.5 fte

Assessment:	Scientific quality	5
	Productivity	-
	Relevance	5
	Vitality and feasibility	5

Division of Human Nutrition

Before going in to detail for each Chair group there was a brief presentation as to how the three Chair groups (nutrition and health, nutrition and epidemiology, and nutrition, metabolism and genomics) cooperate and worked together extremely well and effectively to strengthen the integration and cohesion of their work, linking cells, to individuals to populations. Each group lead at one level but it was clear that there was genuine collaboration and cross- fertilization that strengthened each group.

Quality

The research mission is shared with the overall Human Nutrition group but is focused on three research lines: the intestine as gatekeeper and regulator of systemic health; nutrient sensing; inflammation in obesity and obesity related disorders. The research is well integrated both within VLAG and with NUTRIM as well as nationally and internationally with participation in several large scale EU-funded projects and networks (NUGO).

The leadership is strong and there is a coherent and focused vision.

This is a new group but has the highest Citation Index in VLAG and is rapidly developing a strong international reputation with significant publication in high impact academic journals.

The group is well equipped and has plans to update equipment and is exploring new technologies in this rapidly developing field. The group has been very successful in raising external funding. Bioinformatics support is provided inside VLAG. There are several applications for future funding in the pipeline.

Productivity

Score – not given for reasons below.

The committee realizes that research was founded in 2003 and chooses not rate the aspect of research productivity

Relevance

This area is highly relevant to a number of calls for research examining diet and gene interactions and nutrigenomics. This is an area where the advancement of knowledge is very rapid. It will be some years before the fruits of such new knowledge can be implemented in terms of dietary advice.

Vitality and feasibility

This is a strong research group that is conducting groundbreaking research and with strong interactions in VLAG and NUTRIM and externally both in Europe and in the USA. It was noted that the animal research conducted used knock-out animals generated outside VLAG and that the group did not have access to CLAM unit for continuous monitoring of energy intake, activity and expenditure in experimental animals. The group is dependent on material from large intervention studies to generate meaningful results in humans and will need to

have strong networks in order to access material. It was noted that in order to achieve publications in the highest impact journals such as Cell or Nature Medicine the current publication requirements for PhD candidates may need to be reviewed. This is because a considerably larger body of evidence was needed for publishing in such high impact journals. Funding is currently robust but this may need to be sustained in the long-term. However, the expertise in this area is likely to become mainstream in nutrition research and this group will help maintain VLAG as a world class nutrition research institute which is unique within the Netherlands.

Cluster Nutrition Sciences

15. Toxicology

Current Chair holder: Prof. I.M.C.M. Rietjens
Average tenured research input: 1.8 fte
Tenured research input in 2008: 1.7 fte

Assessment:	Scientific quality	5
	Productivity	4
	Relevance	5
	Vitality and feasibility	5

Quality

The toxicological research is molecular driven mechanistic research focusing on the fields of Food and Environmental Toxicology. The 2 research fields include safety evaluation of new and existing food products, hormone disrupting effects of diffuse contaminants in the human food chain, health risks of nanoparticles in food and environment, development of in vitro and biomarkers techniques for identification and quantification of toxic potencies, development of alternative in vitro and in silico methods for animal experiments and toxicological risk assessment. The outcomes from this research are both relevant to the progress of science as well as the practical performance of risk assessment in the REACH legislation.

Prof. Rietjens took the Chair in 2001 and has increased productivity and had influential leadership of the group, with a strong awareness of the strengths and weaknesses of the group as well as updating mission and goals.

The group has high esteem, with 149 peer reviewed publications in the period 2002-2007, with 39 papers belonging to the top 10% most cited papers and 6 papers in the top 1%.

The group is very small, and most of the productivity is from the 2 Professors, Rietjens and Murk.

Productivity

Academic publications per fte is ~20, with 3 PhDs per fte. The productivity is unequally balanced in the group owing to one underperforming member and one retiring professor. They have significantly increased student numbers over the last 3 years. The productivity is based on the entire group, which as stated, is unequally balanced. Owing to staff changes, this is expected to improve in the future.

Relevance

The scientific strategy is on models systems, from in silico to reporter gene cells to animal experiments, and is relevant to the field of toxicology. They have good strategies to deal with matrix and bioavailability effects in toxicological studies, and this should take on more importance. When combined with Human Nutrition, the work of toxicology should have added value to give better opportunities to interact. The societal relevance is demonstrated by the membership of several national, European and international committees on risk assessments, both targeting development of new strategies for risk assessments for human health and the environment, as well as actual assessments for regulatory use.

Vitality and feasibility

The group has an enthusiastic and knowledgeable leadership, and the extraordinary Chair appointments have added value in various ways to the small department, to increase perceptions of its size. There is a positive attitude for the future, and the group takes on scientific and advisory tasks and is participating in expert committees increasing its visibility. The small size of the group allows a tight focus, and the group should be careful, as they move into positive health effects, not to lose their toxicological focus.

4.2 NUTRIM Maastricht Research lines

NUTRIM Research Line 1 “The metabolic syndrome”

Research line leader: Prof. R.P. Mensink
Average tenured research input: 11.40 fte
Tenured research input in 2008: 8.45 fte

Assessment:	Scientific quality	5
	Productivity	5
	Relevance	5
	Vitality and feasibility	5

Quality

Quality and scientific relevance of the research

The research on metabolic syndrome falls into two areas: 1 energy balance and obesity; 2 diabetes and cardiovascular risk. Most of the research staff are from Human Biology with significant contributions from Health Promotion and Education and Human Movement Sciences. There were also interactions with Complex Genetics and clinical disciplines (internal medicine, eye clinic, pediatrics and radiology)

The research in this line is highly relevant to the epidemic of obesity and diabetes that is occurring worldwide. The research conducted by the group brought together expertise in physical activity and nutrition as well as health promotion and education. This research line had been successful in attracting European Union funding related to metabolic syndrome (DIOGENES, LIPGENE) which involved international collaboration.

Leadership

The research focuses on the prevention or amelioration of components of metabolic syndromes (mainly on insulin resistance and dyslipidaemia and less on hypertension). Obesity and low physical activity were perceived to be the main drivers for metabolic syndrome along with inappropriate fat storage in muscle and liver as opposed to adipose tissue. The research line believed its strength is its combined expertise in nutrition and a physiological understanding of the effects of physical activity.

Academic reputation

The overall Hirsch index for this group was high and the group had recently published a very significant publication in the New England Journal of Medicine regarding the role of brown adipose tissue in thermoregulation. Other achievements have been clearly demonstrating health benefits of plant sterols on dyslipidaemia and the research on trans fatty acids had underpinned recent public health recommendations made by WHO on trans fatty acids.

Resources

The research line has excellent facilities to conduct human dietary intervention studies as well as metabolic studies.

Productivity

A total of 24 PhDs had been awarded over the period 2007-2008. PhD candidates appeared to receive a broad training in transferrable skills and also undertook some teaching responsibilities. There was evidence of regular opportunities of students to present their work both within and without the institution. Over the period of assessment the average number of PhD theses awarded was 2.2 per fte and there were 3.4 PhD/fte tenured staff which is a high load compared with comparable institutions in Europe. Productivity in terms of published outputs was high. The average number of publications in peer-review journals was 158.5. A large number of publications were in low-moderate impact journals but there were a

significant number of publications in the highest impact journals for the area of research.

Relevance

The research is highly relevant to the public health problem proposed by metabolic syndrome. Projects had investigated the relations between level and type of fat and carbohydrate on metabolic syndrome and cardiovascular risk as well as the effect of protein. There was also clear evidence of collaboration with other research groups within Netherlands particularly in the area of nutrigenomics. Much of the research conducted involved human interventions on healthy overweight/obese subjects (as opposed to severely clinical obese subjects) and has great public health relevance. There was a strong translational research theme.

Members of the research line were also involved in national bodies concerned with making nutritional recommendations. It was noted that members of the group are involved in the public understanding of science by being regularly reported in the media (newspapers, radio, television).

Viability and feasibility

The research plans were focused and the sources of research funding were sustainable.

Opportunities

There did not appear to be any close interactions with Research Line 2 where non-alcoholic fatty liver disease was part of that groups remit. There are clearly opportunities to build on the strengths of Research Line 1 in lipid metabolism and the links of fatty liver disease to metabolic syndrome.

NUTRIM Research Line 2 “Gut-Liver homeostasis”

Research line leader: Prof. A.A.M. Masclee
Average tenured research input: 8.65 fte
Tenured research input in 2008: 6.40 fte

Assessment:	Scientific quality	4
	Productivity	4
	Relevance	4
	Vitality and feasibility	4

Quality

Research line 2 has two programs: 1 Gut liver metabolism and 2 Intestinal integrity and defense. The discussion revealed that this RL consists of ~60% clinical and 40% researchers, with equal distribution in tenure positions. Funding of projects is mostly from external sources. Program 1 also addresses NASH which involves cooperation of 3 departments with projects on high protein diet, oxidative stress, inflammation and cell death. There is focus on hepatitis C or liver transplantation which is done in cooperation with the University Aachen. Within IBD, they plan to develop noninvasive markers and have access to a twin cohort. A strategy for the colon cancer cohort is yet to be developed.

Quality and scientific relevance of the research

The overall topics of this research line are highly relevant and of importance for the understanding and future therapies of diseases and diseases progression of NAFL, IBD and colon cancer.

Leadership

The researchers have chosen a bottom up approach, allowing projects from individual researchers coming up into this rather new research line. The strategy and organization of this research line, however, remained unclear.

Academic reputation

The researchers have good national and international networks but differences in long-term research tracks in these fields.

Resources

The large cohorts for the different diseases or risk for these diseases are impressive. The biobank and phenotypes offer a great opportunity for future studies.

Productivity

A mean value of 113.5 papers in refereed journals and 7.5 PhD theses over the last 2 years is in line with a good output, based on the short history of this RL, although the discussion revealed a need for more high-impact papers, which might be difficult in this field.

Relevance

The average number of citations per publication as an indicator of the scientific relevance ranged from 1.37 to 2.02 depending of the research discipline is within the range of clinical research departments.

The research line rates very highly their recent key contributions in the field of nutritional effects on intestinal inflammation.

Viability and feasibility

They apply a bottom up approach for this relatively new research line and focus on interdisciplinary cooperation, e.g. on epithelial integrity. Their major research aims will be the IBD cohort, neuroimmunology and metabolic research.

Strategy

As summarized under leadership the long-term research plan and driving hypotheses could be developed in more detail. In particular, the plans for the use of data derived from the available cohorts remains unclear.

SWOT analysis

Strengths: interdisciplinary clinical network, large (prospective) clinical cohorts, biobanks.

Weaknesses: scientific hypothesis-driven strategy.

Opportunities: study the pathophysiologic role of interorgan communication in human models.

Robustness and stability

Given the importance of this field, the large cohorts, the planning of successors for retiring researchers should be taken care of.

NUTRIM research line 3 “Chronic inflammatory disease and wasting”

Research line leader: Prof. E.F.M. Wouters
Average tenured research input: 9.50 fte
Tenured research input in 2008: 5.35 fte

Assessment:	Scientific quality	5
	Productivity	4
	Relevance	5
	Vitality and feasibility	5

Quality

Quality and scientific relevance of the research

Research is mainly basic and clinical, and has a strong focus on medical and patient aspects. The research is concentrated on (1) the respiratory system and on (2) skeletal muscle weakness with a mission “Determinants and pathways in respiratory and systemic inflammation in chronic disease”. The group has a strong medical/clinical profile, and where necessary, collaborate with others with expertise in antioxidants (for example). Strength is in optimal clinical sub-typing of patients. Were the first, 20 years ago, to introduce concept of muscle wasting in COPD.

Leadership

The research line appears to have strong and influential leadership, with a strong and maintained focus on the mission and goals.

Academic reputation

Wouters is very well established, for example by publications in the Lancet and a good H-factor. The group has few competitors, but this depends on the definition of research area.

Resources

While the research line has had some success in obtaining EU funding, the review committee feels that this could be improved.

Productivity

The number of academic publications per fte is ~10. In 2007 and 2008, they had 100 refereed publications and 5.5 PhD theses. The numbers of PhD students seem lower compared to other research lines.

Relevance

The group is dealing with patients and one of the strengths is to translate scientific findings into clinical practice with immediate effect. They have done intervention studies but merely proof of concept trials since the research has a strong basic element. In addition to nutrition, exercise is an important area within this research line.

Vitality and feasibility

The research line seems strongly focused on their core expertise and happy to collaborate, but only where necessary, and do not want to dilute their expertise. They have important input into the future Maastricht longitudinal study on 10,000 individuals, the so called Maastricht Study. Give the appearance of being confident and knowledgeable in the area. There are difficulties in getting younger clinical academics, and they have partially solved this by recruiting from their own students.

NUTRIM Research Line 4 “Gene-environment interactions”

Research line leader: Prof. F.J van Schooten
Average tenured research input: 6.85 fte
Tenured research input in 2008: 12.40 fte

Assessment:	Scientific quality	4
	Productivity	4
	Relevance	4
	Vitality and feasibility	5

Quality

Quality and scientific relevance of the research

The research mission of research line 4 is to study the influence of environment, food and lifestyle together with the genetic background on the onset of chronic diseases. The research is concentrated around two research themes: 1) Disease susceptibility and 2) Toxicogenomics. The quality of the scientific research is high and partly original, especially in the field of bioinformatics. The research is well integrated both in house, nationally and internationally with participation in several influential EU-projects.

Leadership

The group is coherent and strong with a good leadership complying with mission and goals.

Academic reputation

The individual members of the group have strong connections to national and international scientific networks and clusters. The group is leading in the fields of bioinformatics, proteomics, toxicogenomics, biomarkers of DNA damage and repair, exemplified by crucial positions in national, EU and international consortia.

Resources

The tenured staff has good capabilities for attracting national and international funding for postdocs and PhDs (6 fte raise funding for close to 40 additional staff).

Productivity

The productivity is good. Over a period of two years, 2007 and 2008, the group has had 184 articles in refereed journals and 14 PhD theses, which is roughly 12,5 per year per tenured staff member.

Relevance

The scientific relevance is illustrated by a citation score above the world average score. The societal relevance for the mostly basic research may seem somewhat limited at the stage of development for instance for some of the bioinformatics data, but all the research results are foreseen to become utmost applicable for the identification, understanding and characterization of nutritional, environmental and lifestyle factors in interaction with the human genome leading to the onset of chronic diseases within the next 6 year period.

Vitality and feasibility

Strategy

The strategically planning includes stimulation of translational research to fit in MUMC+ but without losing nutritional/environmental etiological research, and stimulation of talented young scientists.

SWOT analysis

Strengths: Leading in strong national and international EU networks.

Weaknesses: Difficulties in finding highly talented PhD students.

Opportunities: Post genomics and system biology tools are powerful avenues to pursue for the group as well as application of omics-biomarkers in the human situations. Establishment of a bioinformatics master degree and a Chair in bioinformatics would strengthen the group.

Threats: A part of the research line does not fit in the new orientation of NUTRIM.

Robustness and stability

The expertise within the group is very good to excellent. Also the group seems stable, although rather composite due to the broadness of disciplines. The funding strategy is sound based upon anticipated continuing support from University, government and EU.

Annexes

Annex 1.

Main characteristics of the SEP and interpretation of criteria

Main characteristics of the SEP

The Standard Evaluation Protocol entails two main characteristics:

- **Two levels of assessment:** The assessment takes place at two levels of research organisation, i.e. the level of the Graduate School (A-level) and the level of Chair groups (B-level);
- **Four main criteria:** The assessment entails four main criteria, i.e. quality, productivity, relevance, and vitality & feasibility.

The graduate School and the Chair groups are supposed to give sufficient information in their self assessment reports for a thorough preliminary judgement of their performance.

The evaluation committee is requested to report its findings along the four main criteria.

Regarding the institute level the findings should be reported in qualitative terms with a focus on policy and management questions. For the assessment of the Chair groups, the verdict should be cast in both qualitative and quantitative terms. In the text, the most important considerations of the committee should be clarified, while the conclusion should be summarized in a single term according to a five point scale, "excellent" meaning world class research, and "unsatisfactory" below standards. The committee is requested to consider the full range of the five point scale and apply the criteria according to the descriptions given.

Range

5. Excellent

Research that is world leading. Researchers are working at the forefront of their field internationally, and their research has an important and substantial impact in the field.

4. Very good

Research that is internationally competitive and makes a significant contribution to the field. Research is considered nationally leading.

3. Good

Work that is competitive at the national level and makes a valuable contribution in the international field. Research is considered internationally visible.

2. Satisfactory

Work that is solid but not exciting, but adds to our understanding. Research is nationally visible.

1. Unsatisfactory

Work that is neither solid nor exciting, flawed in the scientific and or technical approach, repetitious of other work, etc.

Interpretation of criteria and elements that are to be considered

The four criteria should always be reviewed in relation to the mission of the Graduate School or Chair group, especially if this mission restricts the institute or group to operate only for/in a national scientific community. The criteria are to be understood in the following way:

Criterion 1: Quality

Quality refers to the level of the research conducted by the researchers of an institute and its groups or programmes compared to accepted (international) standards in that field. As a rule, quality is measured by judging the international academic reputation, the position and the output of the unit to be evaluated. However, in the case of a national orientation of a research field, the point of reference consists of other groups in the country. When judging research quality, the following elements are to be considered:

Quality of the research:

Leadership of the Graduate School and the individual leadership of the principal investigators, including research policy and research management.

The academic reputation of the group or programme:

Organizational aspects of the institute and of the research programmes such as the human and financial resources.

PhD training: For the A-level (Graduate school level) an assessment of PhD training is included.

The Graduate School intends to be accredited once every six years through the so called ECOS-accreditation under the auspices of the Royal Netherlands Academy of Arts and Sciences (KNAW). This accreditation focuses primarily on PhD training, but also on a number of other research activities of the research school. An ECOS-accreditation is usually sought shortly after an external peer review (SEP-evaluation), because this evaluation may be used as input for the ECOS-accreditation. In order to diminish the administrative burden and to optimize the link between the SEP-evaluation and the ECOS-accreditation, the evaluation committee is requested to focus on:

- objectives and outcomes of the course programme
- the quality (-assurance) of the PhD course-programme
- the success rates
- training and supervision, incl. selection and progress monitoring;
- the institutional embedding of the programme in the research organization
- collaboration in research

Furthermore, the committee is requested to reflect on the educational resources, such as the availability of courses and the endeavours to improve these.

Criterion 2: Productivity

Productivity encompasses all the various activities and outputs of the research. Productivity should always be assessed relative to the mission and resources of the Graduate School and Chair group. Elements to be considered are:

- The output to the scientific community and the output for wider audiences are to be judged. Quantitative and qualitative measurements may be used.
- The policy measures to render the output to the best and most relevant level possible. Of course the output needs to be reviewed in relation to the input in terms of human resources (tenured staff).

Criterion 3: Relevance

This criterion covers both

- the scientific and the technical, and
- the socio-economic and societal impact of the work.

To address the first element the bibliometric analysis is a very helpful tool (but it needs to be read with thorough understanding of the context).

To address the second element the results of the research can be considered from different angles:

- *Societal quality*. This concept refers to the value put upon research and its (expected) results by specific stakeholders or society at large. It may also refer to the contribution of research to important issues and debates in society.
- *Societal impact*. This concept refers to how research affects specific stakeholders. This can be measured, for example, via behavioural change of actors or institutions.
- *Valorization*. This concept refers to economic, technological and socio-cultural benefits of research.

Criterion 4: Vitality & feasibility

This dual criterion addresses the graduate school's / Chair group's ability to adequately react to important changes in the environment. It refers to both internal (personnel, research practice) and external (developments in the field and in society) dynamics of the group and can best be assessed via the SWOT-analysis.

- At the graduate school level, the ability and flexibility may be shown by performances / achievements in its assignments and adjustments in a changing environment.
- At the level of the group it may be shown by, for example, the way in which professional projects and the human resources are managed. This regards an assessment of policy decisions as well as assessment of project management, including cost-benefit analysis, subject choices, concentration of research lines, etc.

Annex 2.

Checklists

Checklist for Graduate School as a whole for internal use by the evaluation committee

CRITERION	SUB-CRITERION	Elements to be considered
A. Quality	A1. Quality and scientific relevance of the research	Overall quality and significance of the output; Scientific and technological relevance of the research themes / programmes.
	A2. Leadership	Management processes; Mission and goals; Strategy and policy to promote coherence and quality
	A3. Academic reputation	(Inter)national position and reputation of the institute
	A4. Resources	Human resources; Funding policies and earning capacity; Research facilities
	A5 Training and education	<ul style="list-style-type: none"> ○ objectives and outcomes of the course programme ○ the quality (-assurance) of the PhD course-programme ○ the success rates ○ training and supervision, incl. selection and progress monitoring; the institutional embedding of the programme in the research organization ○ Collaboration in research
B. Productivity	B1. Productivity strategy	Productivity goals; Publication strategy; Rewards and sanctions
	B2. Productivity	Scientific publications and PhD-theses; Professional publications; Output for wider audiences
C. Relevance	C1. Scientific relevance	Relative impact / citation scores (bibliometric analyses)
	C2. Societal relevance	Availability of research output for users; Socio-economic and cultural impact and significance of research results for stakeholders and society at large
D. Vitality and feasibility	D1. Strategy	Strategic planning; Contribution to promotion of research quality and coherence; quality assurance; admittance policy for Graduate School members.
	D2. SWOT-analysis	Analysis of the position of institute; Analysis of strengths and weaknesses
	D3. Robustness and stability	Research facilities; Financial resources; Staff competition; Mobility and attractiveness; Expertise within the institute

Checklist Chair group for internal use by the evaluation committee

The numbers refer to the five point scale explained in chapter 2: 5 = *excellent*, 4 = *very good*, 3 = *good*, 2 = *satisfactory*, 1 = *unsatisfactory*.

The “subcriteria” and “elements to be considered” are just an aide memoire and in no way should provoke a discussion about how to rate or how to weight these individual items. The elements are identified to help the peer in grounding his conclusions.

CRITERION	SUB-CRITERION	Elements to be considered	Score range 1 – 5 (.5 score allowed)
A. Quality	A1. Quality and scientific relevance of the research	Originality of the research approach and ideas; Significance of the contribution to the field; Coherence of the research; Quality of the scientific publications; Quality of other output; Scientific and technological relevance	
	A2. Leadership	Recognized leadership of individual researchers; Mission and goals; Strategy and policy	
	A3. Academic reputation	(Inter)national position and reputation; Prominence of the Chair leader and other research staff; Impact and significance of research results in the field; Relevance of research facilities	
	A4. Resources	Human resources; Funding policies and earning capacity; Research facilities,	
B. Productivity	B1. Productivity strategy	Productivity goals; Publication strategy; Rewards and sanctions	
	B2. Productivity	Scientific publications and PhD-theses; Professional publications; Output for wider audiences	
C. Relevance	C1. Scientific relevance	Relative impact / citation scores (bibliometric analyses)	
	C2. Societal relevance	Availability of research output for users; Socio-economic and cultural impact and significance of research results for stakeholders and society at large	
D. Vitality and feasibility	D1. Strategy	Strategic planning; Investments and collaboration; Research topics planned for the near future and their perspectives; Flexibility and anticipation on expected changes.	
	D2. SWOT-analysis	Analysis of the position of the Chair group; Analysis of strengths and weaknesses and adjusted strategy	
	D3. Robustness and stability	Research facilities; Financial resources; Staff competition; Mobility and attractiveness; Expertise within the group	

Annex 3:

Brief Curriculum Vitae of the Peer Review Committee Members

Prof. Brian McKenna (Chair)

**Emeritus Professor of Food Science, UCDUCD - University College
Dublin, Ireland**

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In 2008 Prof. McKenna retired from his position as Professor of Food Science and Chairman of the Department of Food Science at the University College Dublin (UCD). Currently he is occupied with food consultancy and on completion of his term as Vice-president, which ended in 2008.

Prof. McKenna studied Chemical Engineering at UCD until 1966 and was Research Engineer at the National Dairy Research Centre until 1969. The next 20 years he was Lecturer (various grades) in Agricultural & Food Engineering at the UCD. From 1989 on he held position as Professor of Food Science and Chairman of Department of Food Science. Besides he held several managerial positions at the UCD: he was Dean of Postgraduate & Interdisciplinary Studies, Vice President of UCD for Academic planning & Development, and Vice President of UCD and Principal, College of Life Sciences, one of the 5 and the largest College of the UCD. He was awarded title Emeritus Professor in 2008. Next to his occupation at UCD he was editor of the Journal of Food Engineering, President of the Institute of Food Science & Technology of Ireland and, to date, President of the European Federation of Food Science & Technology.

ETP Food for Life, Board member

Food Safety Authority of Ireland, Scientific Committee member.

His main research interests reach from physical properties of foods and meat texture to food safety and shelf-life prediction of foods. He wrote 12 books and numerous papers.

University College Dublin originated in 1854. It is also called the 'National University of Ireland, Dublin'. It is the largest university in Ireland and hosts over 22,000 students (75:25 split between undergraduate and graduate students). Originally it was organised into 11 Faculties but after a re-organisation in 2003 into 35 Schools in 5 Colleges, the largest of which is the College of Life Sciences, initially led by Prof McKenna, comprising 8 Schools, each with over 1000 staff and an annual budget of over € 200 million.

Prof. Jose M. Aguilera

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Prof. Aguilera is currently professor of Food Engineering at the P. Universidad Católica de Chile in Santiago. As chemical engineer, he holds a MSc. degree in food technology from MIT and a PhD in food science from Cornell University. He has contributed to food technology and engineering, specifically the study of food microstructure, undertaking research in areas such as structure-property relationships in foods and biomaterials; applications of modern microscopy techniques; and modeling and quantitation of microstructural changes in foods.

He has published more than 150 articles in international journals, several book chapters and is the author or co-author of 12 books, including *Microstructural Principles of Food*

Processing (D.W. Stanley co-author, 1999) and *Food Materials Science* (P. Lillford co-editor, 2008). He is associate editor of *J. Food Science* and member of the editorial board of *Food Biophysics* and *Trends in Food Science & Technology*, among others. He has participated as a keynote speaker at various professional association meetings and as a consultant to the Nestlé Research Center for 12 years. He was recipient of a Guggenheim fellowship (1991), the A. von Humboldt Foundation Research Award (2001), the International Award (1993) and Research and Development Awards (2005) of the Institute of Food Technologists (USA) and in 2006 of the Marcel Loncin Research Prize.

Founded in 1888, the Pontificia Universidad Católica de Chile is currently one of the leading higher education institutions in Latin America and the largest private university in Chile. Approximately 22,000 students are enrolled in undergraduate and graduate programs and the academic staff exceeds 2,000. Its 18 faculties are located four campuses in Santiago. Research is conducted in the fields of engineering, medicine and health, social and natural sciences, agriculture and arts, and literature.

Professor Dr. Markus Antonietti
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Prof. Antonietti is Head of the Colloid Chemistry Department and Honorary Professor at the University of Potsdam/Germany, Institute of Colloid Chemistry and Theoretical Chemistry. He got his diploma degree after five years study at the University of Mainz in June 1983. Afterwards he completed his PhD in Mainz with Professor Dr. H. Sillescu. In 1985 he became assistant professor at the University of Mainz, and in January 1990 he finished his habilitation.

In September 1991 he accepted a position as full professor at the University of Marburg, and in 1993 he was offered the position of Director of the Department of Colloids and Interfaces at the Max Planck Institute. This makes him responsible for a group of 60 permanent and temporary staff, technicians as well as doctorate candidates and senior scientists.

His expertise covers a variety of research fields, including: Synthesis and properties of functional polymers, polymerization in organized phases and nanodroplets, amphiphilic block copolymers, crystallization control of polymers, mesoporous materials, sustainable chemistry and natural carbon materials. He wrote around 400 well cited refereed publications, and his H-index is 72. He also got a number of awards.

He is editorial board member of a number of scientific journals, e.g. the *Macromolecular Journals of Wiley-VCH*. He is Member of the president board of the "Berlin-Brandenburgischer Verband für Polymerforschung", Vice Sekretar of the "Class of Natural Sciences" of the BBAW, and Member of the board of the "Fonds of the Chemical Industry".

The Max Planck Institute of Colloids and Interfaces was founded in 1992. Starting with three, the institute has now five departments. The institute was evaluated in the Ranking of the Scientific Council at the first place (together with the MPI of Kohlenforschung in Mülheim) among all Chemistry Research Institutions of Germany.

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Prof. Delcour is Professor of Food Chemistry and Biochemistry at the Katholieke Universiteit Leuven. He was a Youth for Understanding (Ann Arbor, MI, USA) foreign exchange student in Marshall, MN, USA, in 1974-1975 and, subsequently, obtained a BSc (“kandidaat”) degree in agricultural engineering (1977), and MSc (“ingenieur”, 1980) and PhD degrees in food science and technology (1985) from the Katholieke Universiteit Leuven in Belgium where, in the Faculty of Bioscience Engineering (Group Science & technology), he is responsible for the Laboratory of Food Chemistry and Biochemistry, a research unit he founded in 1991, and which, today, is fully equipped based on competitive funding, and has 38 staff members of which 33 based on competitive funding.

Prof. Delcour’s research activities focus on cereal constituents and the way they affect quality and nutritional profile of cereal-derived products such as bread, malt, beer, and animal feed.

He is a “Highly Cited Scientist” in the field of agricultural sciences, co-author of over 275 original peer reviewed international publications, and of more than 18 patent applications and/or patents. Jan was awarded the William F. Geddes Memorial Award and the Thomas Burr Osborne Medal of the American Association of Cereal Chemists International. He has a track record in the development of novel technologies for the food industry from concept stage till industrial application. Some examples patented discovery of xylanase inhibitors which allowed the design and commercialization by a licensee of a new generation of xylanase enzymes that are not inhibited by xylanase inhibitors, and a novel method allowing to reduce the boiling time of parboiled rice from 20 minutes to 10 minutes. Jan is co-founder and Chairman of the Science Advisory Board of FUGEIA (www.fugeia.be).

The Catholic University Leuven was founded in 1425 and is Belgium’s largest University catering for more than 33,000 students. The university counts fourteen faculties, fifty departments and about 240 sub-departments. It strongly focuses on top level research. The technology transfer office, K.U.Leuven Research & Development, has operated since 1972, and has overseen the incorporation and provided guidance to more than 80 spin-out companies (several of which have become quoted companies) as well as managing a large patent portfolio.

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Prof. Haddleton is Head of the Inorganic and Materials Section and Professor of Chemistry at the University Warwick, UK. He got his D.Phil. degree after six years study at the University of York in October 1986 with his PhD under the supervision of Professor Robin Perutz. In 1986 he became PDRA the University of Toronto with Professor Geoff Ozin and 1987 accepted a position as Senior Scientist with ICI, he spent his first year at ICI on secondment at the University of Southern Mississippi working with Professor Anselm Griffin. In October 1993 he accepted a position as lecturer at the University of Warwick and in 1997 he was offered the position of Professor of Chemistry.

His expertise covers a variety of research fields, including: Synthesis and properties of functional polymers, controlled polymerization, polymers for biological applications. He has published over 250 well cited refereed publications, and his H-index is 43.

He is currently the Chair of the Macro Group UK and founded the company Warwick Effect Polymers Ltd. He is the editor in chief of the RSC journal Polymer Chemistry and has just retired as Editor in Chief of European Polymer Journal after 6 successful years He is also a board member of a number of scientific journals, e.g. the Chemical Communications, Journal of Polymer Science.

The University of Warwick was founded in 1962 and is currently ranked 5th best in the UK for research and the Chemistry Department was recently judged to be the 7th best in the UK for research. The Department has 35 full time academic staff covering all aspects of chemistry,

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Prof. Johnson leads the gastrointestinal cancer prevention team within the Intestinal Biology of the Gastrointestinal Tract Programme at the Institute of Food Research (IFR).

He graduated from London University in 1971 (BSc Hons; Zoology & Comparative Physiology) and from Aston University in 1974, with a PhD on the intestinal transport of folates. He subsequently held post-doctoral positions at the Universities of London and York, and moved to the newly formed Nutrition Division at IFR in 1979. He holds honorary chairs in the schools of Medicine, Health Policy and Practice, and Biological Sciences in the University of East Anglia.

Prof. Johnson's research at IFR was initially concerned with the mechanisms underlying the effects of dietary fibre on nutrient absorption, and carbohydrate and lipid metabolism, but he has since developed a broader research programme on the biology of the gut, and on relationships between diet and human health. The main areas of current interest are concerned with the protective effects of diet against gastrointestinal cancers, the biological effects of certain phytochemicals, and the impact of diet and metabolic status on epithelial epigenetics.

He served as European coordinator of EU shared-cost projects on the effects of glucosinolates and flavonoids on human health. He has been a member of several advisory committees on food and health, and is currently a member of the Scientific Advisory Committee of the British Nutrition Foundation, and a specialist advisor on dietary fibre to the UK Food Standards Agency. He has published over 150 refereed papers on human nutrition and related topics, and was identified as an "ISI Highly Cited Researcher" by Thomson Scientific in 2003. In 2007 he was presented with *JK Puri Lifetime Achievement Award* for studies on anticarcinogenic effects of glucosinolates, at the 12th International Rape Seed Congress at Wuhan in China.

The Institute of Food is an Institute of the Biotechnology & Biological Sciences Research Council, located close to the University of East Anglia on the Norwich research Park. It is the UK's only integrated basic science provider focused on food, and its mission is to provide internationally significant research on the prevention of food-related disease. IFR research feeds into national and international strategies, and supports advice for UK Government, public sector bodies, regulatory authorities, industries and consumers.

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Prof. Knorr is Director of the Institute of Food Technology and Food Chemistry since 2001 and Head of the Department of Food Biotechnology and Food Process Engineering at the Berlin University of Technology since 1987.

He obtained his Engineering Degree (Dipl.-Ing.) in 1971 and a PhD in Food and Fermentation Technology from the University of Agriculture in Vienna in 1974. He was Research Associate at the Dept. of Food Technology in Vienna, Austria, Visiting Scientist at the Western Regional Research Centre of the US Department of Agriculture, Berkeley, USA, at the Department of Food Science Cornell University, Ithaca, USA and at Reading University, Reading, UK. As Visiting Professor he was connected to the Association of Biotechnological Research, Braunschweig, Germany, and held position as Associate Professor, Full Professor and Acting Department Chair at the Department of Food Science, University of Delaware, Newark, DE, USA.

He is editor of the Journal of Innovative Food Science and Emerging Technologies (editor of Food Biotechnology until 2000), Research Professor at the University of Delaware, USA, and Adjunct Professor at Cornell University, USA.

In 2004 he got the Marcel Loncin Research Prize of the Institute of Food Technologists (IFT), the Alfred-Mehrlitz Award of the German Association of Food Technologists and the EFFoST Outstanding Research Scientist Award. He published approximately 400 scientific papers and holds 7 patents.

Nicholas Appert Award, IFTs highest award 2003 ISI highly cited researcher member Internat. Academy Food Science and Technology

ETP Food for Life, Chair working group Food quality & Manufacturing

European Federation of Chemical Engineering (EFCE). Section on Food, Chair

Center for Preventive Foods, Berlin coordinator, integration of all the food/nutrition related research institutions to create research synergisms (4 universities, 2 Max Planck, 3 Leibniz, 1, Fraunhofer, 2 Federal research institutes etc) in the region

The Berlin University of Technology covers a broad spectrum of academic disciplines, ranging from engineering science to natural science, planning science and economics, as well as the humanities and social sciences. It hosts well over 25,000 students. Each year 400 doctoral degrees can be granted. The Department of Food Biotechnology and Process Engineering focuses especially on food biotechnology and food process engineering and regards the interaction of food science with related areas such as production agriculture, postharvest operations and nutritional sciences as essential. The main scientific objectives of the Department include the generation of basic research data and their transformation into applied technologies in the fields of thermal and non-thermal processing, and the better understanding of biological systems for future applications in food biotechnology. Today research is focused on non-thermal technologies as high hydrostatic pressure, pulsed electric fields and ultrasonic treatment as well as on fundamental analysis of vegetable microstructures using plant cell cultures as a model system.

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Prof. Knudsen is Chief adviser in Food Safety and Toxicology, retired from the Danish Institute for Food and Veterinary Research by June 2006. He currently is President of International Life Sciences Institute Europe, ILSI Europe, with Offices in Brussels, Belgium. He obtained his diploma DVM from the Royal Veterinary and Agricultural University, Copenhagen in 1966. First he was connected to the Institute of Toxicology, National Food Agency of Denmark, Ministry of the Environment as scientist and later as principal scientist. In 1980 he was offered the position of Deputy director of this Institute and from 1987-2001 he held position as Executive Director of the Institute of Food Safety and Toxicology, Danish Veterinary and Food Administration, Ministry of Food, Agriculture and Fisheries. From 2002-2006 he was Chief Adviser in Food Safety and Toxicology, Dept. of Toxicology and Risk Assessment, Danish Institute for Food and Veterinary Research, Ministry of Family and Consumer Affairs, Denmark with responsibilities concerning the general national and international risk assessment and research initiatives. Besides he held personal membership of several national and international scientific advisory committees within food safety and food safety research with the main activity to coordinate and participate in EC-funded R&D projects in the fields of novel foods, genetically modified foods, functional foods addressing food safety, risk-benefit assessments, using new approaches in *in-vitro* and *in-vivo* testing applying probabilistic, genomic and profiling techniques. He was member of Scientific Steering Committee of the European Commission, member of the European Commission's Scientific Committee on Food, Chairman for this Committee and member of the WHO Expert Advisory Panel on Food Safety in Geneva, Switzerland.

The Institute of Food Safety and Toxicology was funded in 1968 as an integrated part of the Danish National Food Institute. The Institute has developed scientific expertise within all areas of chemical and microbiological food safety as well as safety assessment of novel foods and genetically modified foods. Testing procedures *in-vivo*, *in-vitro* and *in-silico* are well established, and procedures for risk assessment in national and international settings are in place. The Institute is today integrated with the Danish Technical University of Denmark, DTU.

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Prof. Margetts is Professor of Public Health Nutrition at the University of Southampton, School of Medicine
He obtained a BSc in Anatomy and Human Biology from the University of Western Australia, an MSc in Human Nutrition from the University of London, and a PhD in nutritional epidemiology from the University of Western Australia. He holds visiting professorships at the North West University in South Africa and at the University of the Sunshine Coast, in Australia. He is Fellow of the Faculty of Public Health and recently was awarded an honorary doctorate from the North West University in South Africa.

He moved to the UK in 1985 to take up a post as nutritionist at the MRC Environmental Epidemiology Unit, in Southampton, and has remained in the University of Southampton ever since (being a devoted Southampton football club and Hampshire cricket club member). In 1986 he established the UK Nutritional Epidemiology group, which led onto running an EU Summer course in Nutritional Epidemiology for over ten years which was repeated all over the world. A course text entitled Design Concepts in Nutritional Epidemiology arose out of this work. He established the MSc in Public Health Nutrition in Southampton. He was the founding Professional Affairs Officer of the Nutrition Society and was responsible for establishing the professional register and accreditation in Public Health Nutrition. He was the founding Editor-in-Chief of Public Health Nutrition. Recently he has been appointed as the first President of the World Public Health Nutrition Association. He has an active research programme running in the UK, India, and South Africa focusing on translating evidence into effective interventions aimed at improving health in the most vulnerable in society.

The University of Southampton was established in 1862 and currently has 14,000 undergraduate and over 1500 postgraduate students from around the world. The University has a turn over of £325 million and is ranked in the top ten in the UK; the medical school is ranked in the top six for its undergraduate teaching and in the top three in the UK for research.

Prof. Michael Roden
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Prof. Roden is Professor of Medicine and Head of the Department of Medicine/Metabolic Diseases at the Heinrich-Heine University Düsseldorf, and Director of the German Diabetes Center, Düsseldorf, Germany.

He obtained his MD and certifications in Internal Medicine, Endocrinology and Clinical Pharmacology at the University of Vienna, Austria. He completed post-doc fellowships at the Pharmacological Institute at the University of Vienna and as a Max-Kade Fellow at Yale University, New Haven, CT. Then he held a tenure position as Associate Professor of the Division of Endocrinology and Metabolism, Department of Medicine at the Medical University of Vienna. Subsequently, he became the Head of the Medical Department and Coordinator of the Teaching Hospital of MUW, Hanusch Hospital, and Director of the Karl-Landsteiner Institute of Endocrinology and Metabolism, Vienna. Since 2008 to date he holds position as Chair and Head of the Department of Medicine/Metabolic Diseases at the Heinrich-Heine University, and Director of the German Diabetes Center, Düsseldorf, Germany.

He combined multitracer dilution techniques and multinuclear magnetic resonance spectroscopy to non-invasively assess metabolic pathways in humans. He contributed concepts to nutrient-induced insulin resistance and to hepatic glucose metabolism.

He received many (inter)national awards including the International Novartis Award for Innovative Patient-Oriented Research (2004), the European Society for Clinical Investigation-Award (2006) and the Oskar-Minkowski Prize by the European Association for the Study of Diabetes (EASD, 2006). He published more than 200 papers in peer-reviewed journals and his work is continuously supported by EFSD/EASD, JDRF, Austrian Science Foundation and Austrian National Bank. He was President of the Austrian Diabetes Association and is the President-elect of the Central European Diabetes Association. Currently he serves as Associate Editor of Diabetic Medicine and European Journal of Clinical Investigation and is Member of the Editorial Boards of the American Journal of Physiology and Endocrinology.

The “University Duesseldorf” was founded in 1965, and renamed in 1989 after Heinrich Heine, one of the most famous German poets of the 19th century . Currently the university hosts about 25.000 students. It offers a wide range of academic programs. One of the missions of the university is scientific research and instruction within a network of international cooperation.

Prof. Paul Ross

**Teagasc – the Agriculture and Food Development Authority
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Prof. Ross is Head of Biotechnology at the Teagasc, Moorepark Food Research Centre (MFRC), Teagasc and a Principal Investigator in the Alimentary Pharmabiotic Centre (APC) at NUI, Cork.

He graduated with a B.Sc. in Microbiology/Biochemistry in 1984 and with a PhD in Microbiology in 1989, both from NUI, Cork. He took up a post-doctoral fellowship at the Dept. of Biochemistry, Wake Forest University Medical Centre, Winston-Salem, NC, USA. While there, he was promoted to the position of Assistant Professor and was a founding faculty member of their Molecular Genetics Programme. He returned to Ireland in 1993 to take up a Senior Research Officer position at Teagasc, Moorepark to lead the research programme on Dairy Biotechnology. In 1997, he was appointed as Head of the Dairy Quality Department and then further promoted to Senior Principle Research Officer in 2001. Paul is now Head of the Biotechnology Centre at Moorepark.

His main research interests are in antimicrobial peptides and anti-infectives, probiotics, milk bioactives, bacteriocins, gut microbiology and functional foods. He has supervised 33 post-graduate students. He also has coordinated or been a (co-principle) investigator on numerous national, EU and National Institute Health (US) grants. Paul currently stands on National (Food Safety Authority of Ireland) and International (EFSA) committees dealing with GMOs and novel foods. He also is a member of the Executive Management Group of the Alimentary Pharmabiotic Centre, a virtual Centre between NUI, Cork and Teagasc (~ 50 scientists) devoted to the study of intestinal flora and their impact on human health. Paul was awarded the William C. Haines award by the California Research Council for his contribution to Dairy Science in 2007 and The Enterprise Ireland Commercialization award in 2008 and was conferred in March 2009 with a D.Sc. based on published works.

Teagasc is part of the Irish Agricultural and Food Development Authority. The Teagasc, Moorepark Food Research Centre in Co. Cork, is one of two Food Research Centres within the organisation (the second being the Ashtown Food Research Centre in Dublin). The expertise of the MFRC embraces many aspects of food science and technology including food processing and ingredient functionality, functional foods, food cultures, cheese and fermented dairy products, and food safety. The MFRC contains extensive, modern and well-equipped research and processing facilities and is closely linked to the Dairy Production Centre which is also located on the Moorepark Campus, and has both cow and pig production units, and has full responsibility for dairy cow and pig research in Teagasc, with excellent animal feeding and handling facilities. In addition to the emphasis on scientific excellence, the MFRC’s strategy devotes a high priority to innovation management and features many successful industrial outputs, particularly through linkage to Moorepark Technology Ltd – a pilot plant facility located on the MFRC campus, where product development and scale up facilities are on hand.

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Prof. Sanders was appointed to the established Chair of Nutrition & Dietetics at King's College London (University of London) in 1994. He was Head of the Department of Nutrition & Dietetics from 1995-2000, Chair of the School of Health and Life Sciences Research Committee from 2001-2003 and has been Head of the Nutritional Sciences Research Division since 2003. He graduated in Nutrition from Queen Elizabeth College, University of London in 1971. He then worked for UNICEF for two years in Indonesia. He was awarded his PhD in 1997 for research on lipid metabolism in vegans and omnivores. He was awarded a DSc by the University of London in 1996 in recognition of his published research on the nutritional aspects of dietary lipids. He joined the academic staff of Queen Elizabeth College in 1983 and following the merger with King's College London was promoted to Reader in Nutrition in 1991 prior to his appointment as Professor in 1994. He has directed numerous human dietary intervention studies concerned with the health effects of dietary fats particularly with regard to risk of cardiovascular disease and the metabolic syndrome. He has served on several UK government committees including the UK Advisory Committee on Novel Foods and Processes from 1994-2001. He was a member of the WHO/FAO Expert Consultation on the Role of Oils and Fats in Human Nutrition in 1993 and was a member of the WHO/FAO Joint Expert Consultation on the Role of Fats and Fatty Acids in Human Nutrition in 2008. He is a scientific governor and trustee of the British Nutrition Foundation and a Fellow of the Higher Education Academy. He is currently President of the Association of Professors of Human Nutrition in the UK and serves on several international advisory committees. He has published over 250 articles in scientific journals and has written a text book the Molecular Basis of Human Nutrition. He has supervised 16 PhDs and over the past ten years has been awarded over £10 million in research grants. He also is a frequent contributor to television and radio on matters concerned with food and health and has published several popular books for lay audiences concerned with food and health.

King's College London is one of England's oldest and most prestigious university institutions: a multi-faculty research-led university college based in the heart of London with over 19,700 students, of whom more than 6,200 are postgraduates. It is ranked as one of the world's top 25 universities. In the 2008 Research Assessment Exercise, Nutritional Sciences attained the highest ranking profile for the discipline in the UK with a 65% of research activity assessed as world leading in their field or strong international (30% 4*; 35% 3*) and received the highest attainment in the teaching quality assurance assessment.

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Prof. Williamson holds a Chair as Professor of Functional Food at University of Leeds. He obtained his PhD in Biochemistry at the Sheffield University UK in 1983. He continued his scientific career as a postdoctoral researcher at the Emory University, Atlanta, USA. In 1985 he accepted a position as Head of Phytochemicals Group (from 1992) at the Institute of

Food Research, UK. From 2002 to 2007 he was Head of Nutrient Bioavailability, Nestlé Research Centre in Switzerland and in 2007 he became Professor of Functional Food at University of Leeds, UK in the School of Food Science and Nutrition.

His published over 250 refereed scientific publications in Nutritional and Food Biochemistry domain and is an ISI highly cited author in Agricultural Sciences. He was Visiting Professor of Food Safety at University of Surrey, UK, and Honorary Chair at Harbin Medical University, China. He has experience of International Research in both academic, institute and industrial environments, and in supervising and running large multidisciplinary research groups and projects. Wide range of scientific experience including more than 120 invited research seminars at International scientific conferences and Research Centers/Universities, and successful supervision of 20 PhD students. Co-ordinator of multinational projects on phytochemicals and health and Director of a Europe-wide training programme for PhD students in phytochemicals at Institute of Food Research, Norwich, UK. Responsible for ~3.5 million pounds (per year) worth of research at Nestlé Research Center between 2002 and 2007, mainly on nutrient bioavailability. Now scientific advisor on Nutrient Bioavailability especially polyphenols spending ~1 week per month at the Nestlé Research Center.

At the University of Leeds, The School of Food Science and Nutrition has twice been awarded the top RAE rating of 5* and in the latest UK Research assessment Exercise (published Dec. 2008), the School came 4th out of 30 other UK Institutions in its Unit of Assessment (Agriculture, Veterinary and Food Science) with over 55% of its researchers being ranked in the top two (4* and 3*, denoting Internationally Excellent or World Leading research, respectively). No other purely Food Science School was ranked higher than Leeds in the UK.

Prof. Dr. B. Witholt

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Prof. Witholt retired from his position as professor and Chairman of the Institute of Biotechnology ETH-Hoenggerberg HPT in 2006.

He obtained his PhD in Biochemistry at the Johns Hopkins University, Baltimore, Maryland in 1968. Consequently he pursued his research career as a post doc at the University of California San Diego (departments Biology and Chemistry). From 1971 to 1992 he was lecturer and Professor of Biochemistry at the University of Groningen, where he co-founded the Groningen Biotechnology Center (1980), the Zernike Science Park (1983), the BIOSON Institute (1987), and the Groningen Biosciences and Biotechnology Institute (1992). In 1992 he joined the ETH Institute of Biotechnology in Zürich.

Annex 4:

Programme for the VLAG Peer Review 2009 site visit

Monday, 15th June

Time	<i>Location for the plenary sessions (11:00-14:15): Lecture room C8, 1st floor Chemistry building (Dreijen, WUR building 316)</i>		
11.00	Introduction I: 'Starting on common ground', by Committee Chairman Prof. Brian McKenna Introduction II: <u>Graduate School VLAG</u> , by VLAG scientific director Prof. Tiny van Boekel		
12.00	Bibliometric Analysis , by Wouter Gerritsma (information specialist, Wageningen UR library)		
13.00	Lunch meeting with Prof. Martin Kropff , Rector Magnificus of Wageningen University		
13.45	Introduction III: Explaining evaluation according to a five-point scale, Committee's working programme, Reporting etc., by Prof. Brian McKenna		
14.30	<p>WU Site visit I: Product Design & Quality Management (Room 330, 3rd floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. José Miguel Aguilera (R) - Prof. Jan Delcour - Prof. Brian McKenna (C) - Prof. Gary Williamson</p>	<p>WU Site visit II: Physical Chemistry & Colloid Sci. (Room 0025, ground floor, Building 316)</p> <p>Subcommittee: - Prof. Markus Antonietti (C) - Prof. David Haddleton (R) - Prof. Bernhard Witholt</p>	<p>WU Site visit III: Food Microbiology (Room 430, 4th floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. Ian Johnson - Prof. Dietrich Knorr (C) - Prof. Ib Knudsen - Prof. Paul Ross (R)</p>
15.45	<p>WU Site visit IV: Physics & Physical Chemistry of Foods (Room 304, 3rd floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. José Miguel Aguilera (C) - Prof. Markus Antonietti - Prof. David Haddleton (R) - Prof. Brian McKenna</p>	<p>WU Site visit V: Microbiology (Room K0.033, basement, building 316)</p> <p>Subcommittee: - Prof. Jan Delcour - Prof. Dietrich Knorr (C) - Prof. Paul Ross (R) - Prof. Bernhard Witholt</p>	<p>Site visit: NUTRIM (trip to Maastricht) (Repature at 15.45, reception, Biotechnion - building 307)</p> <p>Subcommittee & Dorine Collijn / Fre Pepping): - Prof. Ian Johnson - Prof. Ib Knudsen - Prof. Barrie Margetts - Prof. Tom Sanders - Prof. Gary Williamson</p>
17.00	Transport to hotel 'Nol in 't Bosch (Departure at 17.00, reception, building 307)		Hotel Check-In (Maastricht)
18.00	Dinner / Hotel		NUTRIM General Introduction
19.30	Hotel: Discussion of findings / Reports		Dinner (Maastricht)

(C) - stands for the Chairman of the sub-committee & (R) - stands for the Rapporteur of the sub-committee

Tuesday, 16th June

Time	Parallel sessions	Parallel sessions	Parallel sessions	Parallel sessions
08.45	<p>WU Site visit VI: Food Process Engineering (Room 606, 6th floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. José Miguel Aguilera (R) - Prof. Dietrich Knorr (C) - Prof. Brian McKenna - Prof. Paul Ross</p>	<p>WU Site visit VII: Organic Chemistry (Room 1067, 1st floor, building 316)</p> <p>Subcommittee: - Prof. Markus Antonietti (R) - Prof. Jan Delcour - Prof. Bernhard Witholt (C)</p>	<p>Site visit: NUTRIM 1</p> <p>Subcommittee: - Prof. Barrie Margetts - Prof. Tom Sanders</p>	<p>Site visit: NUTRIM 4</p> <p>Subcommittee: - Prof. Ib Knudsen - Prof. Gary Williamson</p>
10.00	<p>WU Site visit VIII: Bioprocess Engineering (Room 603, 6th floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. José Miguel Aguilera - Prof. Dietrich Knorr (R) - Prof. Paul Ross - Prof. Bernhard Witholt (C)</p>	<p>Discussion of findings Working out the reports</p>	<p>Site visit: NUTRIM 2</p> <p>Subcommittee: - Prof. Ian Johnson - Prof. Tom Sanders</p>	<p>Discussion of findings Working out the reports</p>
11.15	<p>WU Site visit IX: Valorisation of Plant Production Chains (Lecture room 63, ground floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. José Miguel Aguilera (C) - Prof. Jan Delcour (R) - Prof. Bernhard Witholt</p>	<p>Discussion of findings Working out the reports</p>	<p>Site visit: NUTRIM 3</p> <p>Subcommittee: - Prof. Ian Johnson - Prof. Gary Williamson</p>	<p>Discussion of findings Working out the reports</p>
12.15	LUNCH (‘Old’ canteen, ground floor, Biotechnion - building 307)		LUNCH in Maastricht	
13.15	Transport to hotel ‘Nol in ‘t Bosch (departure at 13.15, reception, Biotechnion - building 307) Discussion of findings / Working out the reports		Trip to Wageningen (1h40’)	
15.30	Half-Time Debriefing in Hotel ‘Nol in ‘t Bosch’ (Plenary)			
19.00	Wageningen – Dinner in Restaurant ‘O Mundo’ in Hotel De Wereld, 5 Mei Plein 1 (Transport to the restaurant at 18:45 h)			

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Wednesday, 17th June

<i>Time</i>	<i>Parallel sessions</i>	<i>Parallel sessions</i>
08.45	<p>Site visit X: Human Nutrition I - Nutrition & Health (Lecture room 55, ground floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. Ian Johnson - Prof. Barrie Margetts (R) - Prof. Tom Sanders (C)</p>	<p>Site visit XI: - Biochemistry (Room 2060 , 2nd floor, Transitorium - Building 312)</p> <p>Subcommittee: - Prof. Jan Delcour - Prof. Paul Ross - Prof. Gary Williamson (C) - Prof. Bernhard Witholt (R)</p>
10.00	<p>Site visit XII: Human Nutrition II - Nutrition & Epidemiology (Lecture room 55, ground floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. Ian Johnson (R) - Prof. Ib Knudsen - Prof. Barrie Margetts (C) - Prof. Tom Sanders</p>	<p>Site visit XIII: Food Chemistry (Room 524, 5th floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. Jan Delcour (C) - Prof. Dietrich Knorr (R) - Prof. Gary Williamson</p>
11.15	<p>Site visit XIV: Human Nutrition III - Nutrition, Metabolism & Genomics (Lecture room 55, ground floor, Biotechnion - building 307)</p> <p>Subcommittee: - Prof. Ian Johnson (C) - Prof. Barrie Margetts - Prof. Tom Sanders (R)</p>	<p>Site visit XV: Toxicology (Lecture room 1009, 1st floor, building 316)</p> <p>Subcommittee: - Prof. Ib Knudsen (C) - Prof. Paul Ross - Prof. Gary Williamson (R) - Prof. Ian Johnson</p>
12.30	<p>LUNCH in 'Restaurant of the Future' – Presentation and short tour by Prof. De Graaf (Futurum - building 115, Bornsesteeg 53)</p>	
14.00	<p>VLAG Education & Meeting VLAG PhD council (Lecture room 55, ground floor, Biotechnion - building 307)</p>	
15.30	<p>Meeting with the representatives of the research institutes participating in VLAG: A&F, NIZO, RIKILT, RIVM, TNO-Quality of Life (Lecture room 55, ground floor, Biotechnion - building 307)</p>	
Evening	<p>Discussion of findings / Working out the reports</p>	

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Thursday, 18th June

<i>Time</i>	<i>Full Committee</i>
09.00	Finalising reports
11.00	Meeting with VLAG Management Team (Rector Magnificus will join at 11:45) (Lecture room 63, ground floor, Biotechnion - building 307)
12.00	LUNCH - Committee and VLAG representatives with Rector Magnificus ('Old' canteen, ground floor, Biotechnion - building 307)
13.00 - 15.00	Debriefing meeting with the representatives of VLAG research groups and director of AFSG (Lecture room C8, 1st floor, Chemistry building - building 316)
Afternoon	Finalising reports

Annex 5.

Chair groups / Research lines versus large research conglomerates

The Dutch universities have gone through a series of reorganizations and consolidations since the early 80's. These have generally been directed at increasing the potential societal and economic relevance of academic research.

This has resulted in the creation of large Research Schools, Academic Research Centers, Graduate Programs, Top Institutes, and a large number of research financing programs directed at applications and funded by various combinations of government agencies and half a dozen Dutch ministries with the Ministry of Economic Affairs (EZ) and Education, Culture and Research (OCW) often in the driver seats.

As a result, an increasing number of academic groups is now involved in one or more research consortia. It has turned out that it is possible to manage academic research collaborations to some extent. This has generally led to greater productivity and a resulting increase in the impact of Dutch research in the natural sciences and engineering.

The production of useful patents has been less striking, and the creation of impressive start-ups is still in an early phase. However, there are some successes (Crucell, Agendia, Syncom, Keygene) and lessons have been learned. More can be expected.

All of these measures have modified the Dutch academic landscape to a point where further coalescing of groups might no longer be effective in the long term. Not every professor or research area can be absorbed in ever larger research structures. Some researchers become academics because they relish the freedom to pursue their own ideas during many years, gradually developing a new concept and building a reputation for work that could not have been done with as much devotion and perseverance as is possible in the Netherlands, given the long term support, perhaps modest, but available for an entire career in the Netherlands. These academics must be nurtured and protected.

So, large research groupings will continue to deliver scientific results that are sometimes also socially and economically relevant in the short to mid term. In the longer term however, predictions falter, and it is here that those universities that have supported a good number of independent professors will have the necessary flexibility and agility to lead in new directions and help develop new research areas.

Maintaining this flexibility and agility will require that 20 – 30% of the university research capacity be reserved for individual Chairs. We hope that VLAG and the Wageningen and Maastricht University leadership will agree that reserving such capacity for individual promising Chairs is a sustainable and profitable long term strategy.