External Research Assessment of Cardiovascular Research School Erasmus University Rotterdam (COEUR) 2009-2013

December 2014

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Introduction

Procedures followed

This assessment has been conducted following the Standard Evaluation Protocol 2015-2021 by VSNU (Association of Universities in the Netherlands), KNAW (Royal Netherlands Academy of Arts and Sciences) and NWO. This protocol describes the methods used to assess research conducted at Dutch universities and NWO (Netherlands Organisation for Scientific Research) and Academy institutes every six years, as well as the aims of such assessments.

In preparation of the assessment COEUR has provided the assessment committee with the following documents:

- Their self-evaluation, including:
    - Appendix I: individual themes;
    - Appendix II: Scientific Staff;
    - Appendix III: Recommendations 2009 committee.
- The assessment report from 2008.
- Annual report 2013.

The site visit took place from October 22 until October 24, 2014.

Composition of the external assessment committee

Prof. dr. G. Pasterkamp, chairman, Universitair Medisch Centrum Utrecht, The Netherlands
(Em) Prof. dr. J.H.C. Reiber, Leids Universitair Medisch Centrum, The Netherlands
Prof. dr. S. Janssens, Koninklijke universiteit Leuven, Belgium
Prof. dr. M.D. Ferrari, Leids Universitair Medisch Centrum, The Netherlands
Prof. H. Struijker Boudier, Maastricht University, The Netherlands

Research units assessed

The research of COEUR has been divided into 4 clusters.

The assessment committee had interviews with Cluster Vascular Medicine, Cluster Cardiac Disease - which was divided into basic and clinical, Cluster Acute Cardiovascular Syndromes and Cluster Imaging and Diagnostics development.

Furthermore posters with current research have been presented to the committee by PhD students. Interviews with the COEUR board and the PhD committee have also taken place during the site visit.

Summary

The COEUR institute

COEUR consists of research groups housed within the Erasmus University in which cardiovascular research is executed. The research groups are part of clinical and research departments within the Faculty of Medicine. Some of the research groups have an excellent international track record and belong amongst the world's best. The assessment committee is very positive about COEUR's track record between 2008-2013. However, it is of utmost importance to make the heritage of the scientific past sustainable for the future. Some of the COEUR cardiovascular research lines are operating in the frontline and internationally competitive. This is not just relevant for the exposure of COEUR but also for all cardiovascular research in the Netherlands as a whole. The assessment committee therefore will evaluate the scientific achievement in the past but also paid attention to risks and opportunities to meet the future expectations.

Assessment

Meetings, general aspects.

The committee had the pleasure to meet with many PI's during an informal dinner. The full day assessment was initiated with a meeting with the COEUR board and a representative of the Directory board of the Erasmus medical faculty. Next, the committee had the opportunity to discuss research outcomes, future perspectives and organisational aspects with PI's who are active in the 4 research clusters. The committee was also well informed regarding the educational track record of COEUR. There was a fruitful meeting with poster boards and a face to face discussion the day after with PhD students. Finally, the committee discussed first impressions with the COEUR board and the meeting was finalised with a summary of the committee that was shared with the PI's and the COEUR board. The committee felt that the meetings were transparent in an open minded atmosphere. However, the committee was critical regarding the lack of attendance of key opinion leaders. For example, interventional cardiology and the imaging experimental laboratory are internationally recognised research domains within COEUR. The committee did not meet with any of the interventional cardiologists and also none of the professors of the experimental imaging groups was present. Finally, the capability of COEUR to act as a strong operational leading office is hampered by the organisational structure of the Erasmus medical faculty. This has been a comment of the previous committee as well as the current committee. The committee did ask for a meeting with the dean or director of the board of directors of the Erasmus medical faculty. This request was declined. All together this raised the question within the committee to what extent the outcome of the review will have impact on an organisational and operational level. Therefore, the first advice based on this report is to execute a follow up within two years with a face to face meeting with the board of COEUR to assess whether the committees advice has been taken into consideration. For future evaluations we would recommend to provide in addition to a CWTS analysis of the whole Research School also a CWTS analysis for each cluster. This would facilitate a quantified assessment and comparison of the research output and quality of each cluster.

Advice 1- Install a small committee that executes a follow up after 2-3 years to assess and discuss with the COEUR board to what extent advices of the committee have been taken into account and executed.

Organisation

Medical faculty organisation

COEUR is one of the research institutes within the Erasmus University. The financial and human resource management is decentralised within departments and research groups. This decentralised management structure does not provide COEUR with the tools to directly influence and coordinate research lines and facilities. Budget is very limited and the investments in research lines are based on choices made by the individual departments. In addition, COEUR management is not strongly embedded and represented in high organisational levels within the Erasmus University or Medical faculty. E.g., there is no direct management level in which COEUR directly communicates with the board of the Medical Faculty. The lack of span of control on operational, financial and human resource level makes COEUR vulnerable. This has been discussed with a representative of the board of the medical faculty. It has been pointed out that this decentralised structure will not be changed. On the other hand, the committee gained information that the board of the medical faculty does not provide the research groups and COEUR the transparant information how centralised research budgets are being spent and distributed. The committee will therefore advice the board of the medical faculty to consider the integration of a representative of the COEUR board in a management structure where also the board of directors of the faculty is represented. In addition, it is suggested to make COEUR more influential in research lines by taking an advice of the COEUR board into account when professorships in the cardiovascular field are being considered.

Advice 2- Integrate a COEUR representation in a management level where also board of directors of the medical faculty is present.

Advice 3- The advisory board for the establishment of new professorship in the field of cardiovascular research should include at least one member who represents the board of COEUR.

COEUR organisation

The Themes*Disciplines matrix that COEUR has organised themselves within is rather artificial. The individual researchers feel no specific connection within their cluster in that matrix. In addition, the clusters do not have a governance structure, do not meet or discuss research programs. Within the various clusters there is no strategy or other framework that will facilitate a platform to discuss future perspectives and opportunities. If there is a matrix that does not meet the needs of the researchers then this should be unravelled. The COEUR institute could reorganise research programs in line with the recently exposed vision of the board of directors of the hospital (Koers 2018). This will imply research themes coupled with clinical care focus areas. This could result in improved inter-disciplinary connections between research groups (clinical – preclinical) that are less artificial and more functional.

Advice 4- Reconsider the mission statement. Unravel the current matrix structure and define research themes linked with future care clinical care focus areas; a strategy that is in line with the vision of the board of the hospital (Koers 2018).

Education

The committee is very positive about the educational tracks for PhD students organised and offered by COEUR. Education is a strong aspect in which the organisational skills of COEUR reach the surface. The PhD students are enthusiastic and proud of the institute they are working in. The committee would like to address two issues that are partly inspired by the current financial crisis that research and development academic institutes are confronted with. The future perspectives for researchers who just obtained their degree are far from optimal. The number of postdoc positions is limited and unemployment among fresh PhDs is slowly rising. The promotor and co-promotor could guide the students in the last 1-2 years of their PhD track by giving a fair impression of talent, skills and opportunities of the student. The mentor could then also help the PhD student to open a network in private and public entities so that they can get acquainted with potential positions in the future. In some departments this is already a standard procedure, but the COEUR could prepare a statement that in the annual assessments "future perspectives" should be discussed with all students in the last 1-2 years of their PhD track. The second advice is to generate a strong platform where PhD students meet and greet with other PhDs and PI's. The well-known Friday seminars could be the right platform for this purpose but attendance is low. There should be more commitment of the PI's to attend this meeting and with them the PhD students are likely to follow.

Advice 5- State to all mentors in the PhD track that "future perspectives" should be discussed transparantly with every PhD student in the last phase of a PhD track.

Advice 6- Establish a platform/meeting with strong commitment of the PI's to attend and where the PhD students will have the opportunity to meet and greet with researchers of other groups.

Advice 7- In order to work on COEUR's branding, make it mandatory to mention COEUR in all relevant reports and publications.

Advice 8- Put more emphasis on valorisation in future reports and publications.

Cluster 1: Vascular Medicine

Strategy and targets

The Vascular Medicine Cluster consists of 8 research projects with 56 PhD students.

Coordinators are:
EJG Sijbrands, MD, Prof. Cardiovascular Genetics
HJM Verhagen, MD, Prof. Vascular Surgery
RJ Stolker, MD, Prof. Anaesthesiology
E Boersma, PhD, Prof. Cardiological Epidemiology

Assessment

Researchers cooperate within the vascular medicine cluster, but there are no shared meetings on PI level to jointly coordinate research. Research domains are determined by the individual researchers. This is also due to lack of budget to maintain talent to the cluster or to recruit post docs. Larger research facilities are shared in good faith with other research groups within and outside COEUR. It is apparent that there are a limited number of postdocs working in this and also the other clusters. This is due to limited funding opportunities and a threat for sustainability with regard to research expertise

Research quality

Research quality and output is very good

Score: 2

Relevance to society

This research area performs well. Relevance for society is mostly visible in impact papers that could be relevant for clinical care.

Score: 3

Viability

This is difficult to assess for all research groups together since the interrelationships are limited and quality and output differs.

Score: 2-3

Quality and organization

PhD Programmes

See general comments “education”

Research integrity policy

The PhDs get an obligatory course in science integrity.

Cluster 2: Chronic Cardiac Disease

Strategy and targets

There are 11 research projects in this theme and 48 PhD students.

The coordinators are:
DJGM Duncker, MD, Prof. Experimental Cardiology
AHJ Danser, PhD, Prof. Pharmacology
AJJC Bogers, MD, Prof. Cardio-Thoracic Surgery
WA Helbing, MD, Prof. Pediatric Cardiology
JW Roos-Hesselink, MD, Prof. Congenital Heart Disease

Assessment

For the members of this cluster the strengths of COEUR are based on the educational tracks and not specifically research. In this cluster there is also no governance structure neither are regular PI meetings scheduled. The researchers realise that the individual researchers are appreciated on traditional measures of esteem while funds from private companies are less rewarded.
The large animal research facility is a strongly positioned and homes relevant expertise for translational research. Postdoc positions are rare with the exception of the Danser group which has a strong track record.

Research quality

Research quality based on past performance is very good

Score: 2

Relevance to society

Some research of the group execute well with respect to the societal relevance (animal research and Danser group). On average the group performs well with respect to societal relevance which is mainly based on research papers with clinical impact.

Score: 3

Viability

The experimental work in this cluster is viable but may differ among research groups. The committee has considered a higher score which could have been provided if for instance heart failure research would be executed on a basic level. The molecular biology expertise is limited in this cluster.

Score: 3

Quality and organization

PhD Programmes

See general comments “education”

Research integrity policy

See cluster 1.

Cluster 3: Acute cardiovascular syndromes

Strategy and targets

The Acute cardiovascular syndromes cluster consists of 9 research projects and 49 PhD students.

The coordinators are:
ABJ Groeneveld, MD, Prof. Intensive Care
DWJ Dippel, MD, Prof. Vascular Neurology
FWG Leebeek, MD, Prof. Haematology
PJ Koudstaal, MD, Prof. Vascular Neurology
RJM van Geuns, MD, Prof Interventional Cardiology

Assessment

Thorax centre is a name with strong branding. Just as in other clusters, COEUR is well known in the Netherlands but is not being mentioned on papers and internationally not well known. The interventional cardiology has a track record with an excellent reputation. However, the future perspectives are unclear. This is also not well exposed to the committee due to absence of PI's who are active in the interventional cardiology group. The unknown vision and mission of the interventional cardiology is reflected in the viability score.
Clinical studies are a major success factor for COEUR. There could be a mutual benefit if trial offices could be centralised for different clinical research groups that are operating within COEUR.

Research quality

This highest score is mainly based on the widely known work of the interventional cardiology group (Prof. Serruys) who has retired in the meantime. The work on stents and biodegradable stents has wide impact on clinical practice.

Score: 1

Relevance to society

This cluster is characterised by a large number of private public partnerships and a significant number of clinically relevant impact papers.

Score: 1

Viability

The committee grades the viability as good. This is quite a demotion compared with the current excellent score but is based on the limited information on the future perspectives of the interventional cardiology group.

Score: 3

Quality and organization

PhD Programmes

See general part

Research integrity policy

See cluster 1.

Cluster 4: Imaging and diagnostics development

Strategy and targets

This cluster contains 6 research projects and 34 PhD students.

Coordinators are:
N. de Jong, PhD, Prof. Echography
AFW van der Steen, PhD, Prof. Bioengineering
A van der Lugt, MD, Prof. Neurovascular Imaging
WJ Niessen, PhD, Prof. Medical Informatics
K. Nieman, MD, Ass. Prof. Cardiovascular imaging

Assessment

This cluster is smaller and but more collaborative efforts are visible among research groups. E.g a cardiologist is working next door to the radiologists. The imaging development groups are closely collaborating with clinical interventional groups which facilitates clinical utilisation. Also in this cluster several key PI's were not present but they were well replaced by their coworkers who gave a nice impression of their efforts. The basic technology imaging groups are well known and have an excellent track record with large portfolio of patents and a strive for valorisation.
Its work and researchers are innovative.

Research quality

The experimental technology driven research groups have a very good track record which seems very well viable. The radiology and cardiology departments have performed very well. Pim de Feyter is retired but his heritage will not be lost considering the ongoing collaboration between the cardiology and radiology.

Score: 2

Relevance to society

An impressive number of patents and private public partnerships.

Score: 2

Viability

The value chain from basic research to clinical utilisation is well taken care off. The patent portfolio reveals a strong position for future research.

Score: 1

Quality and organization

PhD Programmes

See general part

Research integrity policy

See cluster 1.

Recommendations

1- Install a small committee that executes a follow up after 2-3 years to assess and discuss with the COEUR board to what extent advices of the committee have been taken into account and executed.
2- Integrate a COEUR representation in a management level where also board of directors of the medical faculty is present.
3- The advisory board for the establishment of new professorship in the field of cardiovascular research should include at least one member who represents the board of COEUR.
4- Reconsider the mission statement. Unravel the current matrix structure and define research themes linked with future clinical care focus areas; a strategy that is in line with the vision of the board of the hospital (Koers 2018). This will imply that focus areas will be chosen for future research.
5- State to all mentors in the PhD track that "future perspectives" should be discussed transparantly with every PhD student in the last phase of a PhD track.
6- Establish a platform/meeting with strong commitment of the PI's to attend and where the PhD students will have the opportunity to meet and greet with researchers of other groups.
7- The name "COEUR" is not branded by the research community. This deserves attention. Make it mandatory to mention COEUR in all relevant reports and publications.
8- Put more emphasis on valorisation in future reports and publications.
9- Reduce the number of projects and reorganise these in line with comment 4.
10- Consider the setup of a centralised trial office for clinical cardiovascular research.

In summary: the COEUR institute has a proven track record, but the brand COEUR needs further promotion. The assessment committee has defined the following main challenges for COEUR:

- How does COEUR become a strong administrative partner on a management level within Erasmus MC?
- How can COEUR preserve its astounding research heritage for the future?

The recommendations that may help to face these challenges are mentioned above.

Appendices

Appendix A – Curriculae Vitae of Review Committee Members

Prof. dr. G. Pasterkamp (chairman)

Dr. Pasterkamp is Professor of Experimental Cardiology and the laboratory of clinical chemistry, at the University Medical Center in Utrecht, the Netherlands.

(Em) Prof. dr. ir. J.H.C. Reiber

Dr. Reiber is professor of medical imaging at the Leids Universitair Medisch Centrum in Leiden, The Netherlands, CEO of Medis medical imaging systems in Leiden and chairman of the Foundation Innovative Medical Devices Initiative (IMDI).

Prof. dr. S. Janssens

Dr. Janssen is Professor of Clinical Cardiology and Head of the Coronary Care Unit in the Department of Cardiology at Gasthuisberg University Hospital, University of Leuven, Belgium.
Dr. Janssen obtained his medical degree in 1984 from the University of Leuven, Belgium, summa cum laude, and finished his clinical cardiology fellowship at Gasthuisberg University Hospital, Leuven, Belgium, in 1989. He subsequently obtained an international John E. Fogarty fellowship from the NIH (Bethesda, MD, USA) to continue his studies in cardiovascular medicine at Massachusetts General Hospital, Harvard University in Boston from 1989-1992. During his research training in Boston, Dr. Janssens focused on the role of Nitric Oxide (NO) signal transduction in the cardiovascular system which has remained one of his prima interests for translational research upon his return to the cardiology division of Gasthuisberg University Hospital in Leuven. He received his PhD degree from the University of Leuven in 1993 where he subsequently became Associate Professor of Medicine in 1997 and Professor of Medicine in 2002. He was appointed head of clinic and director of the coronary care unit and became an independent group leader at the Flemish Interuniversity Institute for Biotechnology in 1996. His research interests focus on understanding the role of NO-cGMP signaling in cardiovascular disease and on innovative strategies for myocardial repair including gene and progenitor cell transfer approaches. Dr. Janssens' scholarly contributions include clinical training of cardiology fellows in acute cardiac care and mentoring international doctoral students in his research laboratory. He served as deputy editor for the European Heart Journal from 2002-2008 and is an active board member of several European and American professional cardiology societies.

Prof. dr. M.D. Ferrari

Dr. Ferrari is Professor of Neurology and Chair of the Leiden Centre for Translational Neuroscience at Leiden University Medical Centre (LUMC) and current President of the Dutch Headache Society. From 2001-2003 he was President of the International Headache Society (IHS). He received his MD (1980), his specialty certificates in Neurology and Clinical Neurophysiology (1985) and his Ph.D. (1992) on "Serotonin and Migraine" (supervisors: George Bruyn & Pramod Saxena) *cum laude* from LUMC. He has been a Research Fellow at Baylor College of Medicine, Houston with Mike Welch, and at Harvard Medical School with Michael Moskowitz. Prof. Ferrari is a Fellow of the American Neurological Association, Honorary Member of the IHS and Italian Headache Society, and has received numerous awards, incl. the Arnold Friedman Distinguished Clinician Researcher (1995) and Harold G. Wolff (1997) Awards from the American Headache Society, the Migraine Trust (2002), European Headache Federation (2006), and IHS Special (2009) Lectures, and the three-annually Hartmann Muller Prize for Biomedical Research from the University of Zurich (2011). The Dutch Neurological Association awarded Dr. Ferrari in 2005 with the five-annually Winkler Medallion for Excellence in Neurological

Research and The Netherlands Organisation for Scientific Research (NWO) bestowed upon him in 2004 the Vici Innovational Research Personal Incentive Schema Award and in 2009 the Spinoza Life Time Achievement Premium, the highest science prize in The Netherlands.

Prof. Dr. H. Struijker Boudier

Prof. Dr. H. Struijker-Boudier is Professor of Cardiovascular Research and Pharmacology at Maastricht University, The Netherlands. He obtained his training in Pharmacology at the Radboud University in Nijmegen where he got his Ph.D. (cum laude) in 1975. He then spent a post-doc traineeship in the Department of Physiology and Biophysics in Jackson, Miss. U.S.A. (head: Prof. A. Guyton). In 1977 he joined the medical school in Maastricht where he was appointed as Professor of Pharmacology in 1980. His research field was the pharmacology of blood pressure control and hypertension as well as experimental heart failure. In addition he developed a program on advanced drug delivery systems. He was chairman of the Department of Pharmacology and Toxicology from 1984-1999 with an intermission of one year when he spent a sabbatical in the INSERM Unit led by Prof. B. Lévy in the Hôpital Lariboisière in Paris. He served as scientific director of the Cardio Vascular Research Institute Maastricht (CARIM) from 1999-2006. He was member and vice-chairman of the scientific council of the European Society of Hypertension from 2003-2011. He is doctor honoris causa of the Université de Liège and is active board member of several European and American cardiovascular research institutes and societies.

Appendix B – Program of the site visit

Wednesday 22 October

17:00 - Arrival at Hotel (Hotel Mainport)
17:30 – 19:30 Meeting Evaluation Committee (Hotel)
20:00 – 21:30 Dinner with COEUR Board (Restaurant de Harmonie)

Thursday 23 October *Location OWR- 6*

09:00 – 10:00 Welcome by COEUR board.
Introduction COEUR research school: E Boersma / F Zijlstra
Introduction PhD Education: AJM Verhoeven/ PJ Koudstaal
Dr. C. Festen, representative of the Dean of Erasmus MC
10:00 – 13:00 **Cluster 1: Vascular Medicine** *Location OWR- 6*
Cluster 2: Chronic cardiac disease *Location OWR- 6*
13:00 – 14:00 Lunch
14:00 – 16:00 **Cluster 3:Acute cardiovascular syndromes** *Location OWR- 6*
Cluster 4: Imaging and Diagnostics development *Location OWR- 6*
16:00 – Coffee/Tea and
– 17:30 Poster presentations PhD students *Location OWR -5*
17.30 – 19:00 Meeting Evaluation Committee *Location OWR -6*
20:00 – 22:00 Dinner Evaluation Committee (Mainport Hotel)

Friday 24 October

09:00 – 09:45 PhD students *Location V 104*
09:45 – 11:30 Discussion with COEUR Board *Location V 119*
11.30 – 14:00 Lunch Evaluation Committee
14:00 – 14:30 Evaluation Committee's first impressions and recommendations *in V 119*
14:30 – Adjournment + Drinks

Appendix C – Quantitative data on the research unit's composition and financing

Vascular Medicine

Composition

	2009	2010	2011	2012	2013
Scientific staff	19,70	28,10	30,65	29,65	25,65
Post-Docs	1,00	2,00	2,00	2,00	2,00
PhD students	34,00	53,00	54,00	58,00	56,00
Support staff	1,56	1,56	1,30	1,30	1,30
Visiting fellows	0,10	0,10	0,10	0,10	0,10
Total	**56,36**	**84,76**	**88,05**	**91,05**	**85,05**

Financing

	2009	2010	2011	2012	2013
Direct funding (est.)	€ 2291 k	€ 3287 k	€ 3497 k	€ 3347 k	€ 2927 k
Personal research grants Royal Academy and comparable		€ 200 k		€ 2854 k	
Consortium funding					
Funding by charity, industry etc.	€ 250 k				
PhD (mostly funded from grants)	€ 1980 k	€ 2430 k	€ 2295 k	€ 2610 k	€ 2520 k
Total	**€ 4521 k**	**€ 5917 k**	**€ 5972 k**	**€ 8811 k**	**€ 5447 k**

Acute cardiovascular syndromes

Composition

	2009	2010	2011	2012	2013
Scientific staff	28,50	33,65	34,35	34,60	31,60
Post-Docs	2,00	1,00	3,00	3,00	4,00
PhD students	42,00	50,00	47,00	49,00	49,00
Support staff	1,80	2,70	2,70	2,70	2,70
Visiting fellows	0,00	0,00	1,00	1,00	3,00
Total	**74,30**	**87,35**	**88,05**	**90,30**	**90,30**

Financing

	2009	2010	2011	2012	2013
Direct funding (est.)	€ 3166 k	€ 3643 k	€ 3920 k	€ 3992 k	€ 3822 k
Personal research grants Royal Academy and comparable	€ 140 k	€ 900 k	€ 20 k	€ 20 k	€ 120 k
Consortium funding	€ 600 k				€ 10450 k
Funding by charity, industry etc.		€ 543 k	€ 197 k	€ 240 k	€ 460 k
PhD (mostly funded from grants)	€ 1890 k	€ 2295 k	€ 2115 k	€ 2205 k	€ 2205 k
Total	**€ 5796 k**	**€ 7381 k**	**€ 6252 k**	**€ 6457 k**	**€ 17057 k**

Chronic cardiac diseases

Composition

	2009	2010	2011	2012	2013
Scientific staff	22,75	26,75	27,00	26,00	25,00
Post-Docs	5,00	6,00	6,00	8,20	4,2
PhD students	36,00	46,00	47,00	45,00	50,00
Support staff	2,00	2,00	2,00	2,00	2,00
Visiting fellows	0,00	0,00	0,00	0,00	0,00
Total	**65,75**	**80,75**	**82,00**	**81,20**	**81,20**

Financing

	2009	2010	2011	2012	2013
Direct funding (est.)	€ 3342 k	€ 3612 k	€ 3555 k	€ 3598 k	€ 3128 k
Personal research grants Royal Academy and comparable	€ 200 k	€ 200 k	€ 10k	€ 1100 k	€ 1365 k
Consortium funding	€ 3500 k	€ 12000 k		€ 1700 k	€ 11900 k
Funding by charity, industry etc.		€ 538 k		€ 259 k	€ 240 k
PhD (mostly funded from grants)	€ 1575 k	€ 2025 k	€ 2070 k	€ 2025 k	€ 2250 k
Total	**€ 8617 k**	**€ 18375 k**	**€ 5635 k**	**€ 8682 k**	**€ 18883 k**

Imaging and Diagnostics

Composition

	2009	2010	2011	2012	2013
Scientific staff	20,00	20,10	21,35	23,05	22,05
Post-Docs	3,00	5,00	5,00	3,00	3,00
PhD students	22,00	38,00	36,00	37,00	34,00
Support staff	0,00	0,00	0,00	0,00	0,00
Visiting fellows	0,00	0,00	0,00	1,00	2,00
Total	**45,00**	**63,10**	**62,35**	**64,05**	**61,05**

Financing

	2009	2010	2011	2012	2013
Direct funding (est.)	€ 2450 k	€ 2663 k	€ 2785 k	€ 2772 k	€ 2702 k
Personal research grants Royal Academy and comparable	€ 4247 k	€ 422 k	€ 860 k	€ 2052 k	€ 1444 k
Consortium funding					
Funding by charity, industry etc.					
PhD (mostly funded from grants)	€ 990 k	€ 1710 k	€ 1620 k	€ 1665 k	€ 1530 k
Total	**€ 7687 k**	**€ 4795 k**	**€ 5265 k**	**€ 6489 k**	**€ 5686 k**

Appendix D – Explanation of the categories utilised

Category	Meaning	Research quality	Relevance to society	Viability
1	World leading/ excellent	The research unit has been shown to be one of the few most influential research groups in the world in its particular field.	The research unit makes an outstanding contribution to society.	The research unit is excellently equipped for the future.
2	Very good	The research unit conducts very good, internationally recognised research.	The research unit makes a very good contribution to society.	The research unit is very well equipped for the future.
3	Good	The research unit conducts good research.	The research unit makes a good contribution to society.	The research unit makes responsible strategic decisions and is therefore well equipped for the future.
4	Unsatisfactory	The research unit does not achieve satisfactory results in its field.	The research unit does not make a satisfactory contribution to society.	The research unit is not adequately equipped for the future.