School for Cardiovascular Diseases

School CARIM

Assessment report

EXTERNAL REVIEW
2013 - 2018

October 23rd- 25th 2019

Preface

This report summarises the findings of the External Review Committee (ERC) of CARIM School for Cardiovascular Diseases at the Faculty of Health Medicine and Life Sciences, University of Maastricht, which was carried out between October 23rd- 25th 2019. In addition to discussions with colleagues from the university, the review process benefitted greatly from the extensive preparation undertaken by CARIM and from the provision of detailed statistics and other information in a standardised and digestible format.

The ERC appreciates the professional assistance provided by the whole CARIM Team. We also thank Maastricht University and CARIM administration, staff and PhD candidates for their contributions in making the review an interesting, informative and rewarding process.

The ERC was pleased to have an external PhD student in the committee. Her being present the whole visitation was shown to be of great value in forming an opinion on the PhD programme.

December, 2019

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1 Introduction

This report presents the results of the assessment of the research and educational programmes of CARIM, School for Cardiovascular Diseases over the period 2013-2018, conducted in October 2019 by an external Review Committee. CARIM is one of six research schools of the Faculty of Health, Medicine and Life Sciences (FHML) embedded in the Maastricht University Medical Centre+ (Maastricht UMC+).

1.1 The External Review Committee

To assess the research and the PhD programme conducted at CARIM, an international External Review Committee was appointed by the Executive Board of Maastricht University. The Review Committee consisted of the following members:

1. Pieter Reitsma (chair), Professor of Thrombosis and Hemostasis, Einthoven Laboratory, Leiden University Medical Center, the Netherlands
2. Chantal Boulanger, INSERM Research Director, Director of the INSERM Cardiovascular Research Center at *Hopital Europeen Georges Pompidou*; Paris, France
3. Thomas Eschenhagen, Professor of Pharmacology, Institute of Experimental Pharmacology and Toxicology, University Medical Center Hamburg Eppendorf
4. Allan Flyvbjerg, CEO and Clinical Professor, Steno Diabetes Center Copenhagen, the Capital Region of Denmark, Copenhagen, Denmark and University of Copenhagen, Copenhagen, Denmark
5. Eike Nagel, Professor for Cardiac Imaging, Institute for Experimental and Translational Cardiovascular Imaging, DZHK (German Centre for Cardiovascular Research) Centre for Cardiovascular Imaging, University Hospital Frankfurt am Main, Germany
6. Ingrid Pabinger, Professor of Haemostaseology, Clinical Division of Haematology and Haemostaseology, Department of Medicine I, Medical University of Vienna
7. Carolina Touw, PhD student, Leiden University Medical Center
8. Dr. Roelinka Broekhuizen, secretary, The Netherlands

All members of the Review Committee signed a statement of impartiality and confidentiality. Additional information on the Review Committee members and their brief *curriculum vitae* can be found in Annex 1.

1.2 Scope of the assessment and documentation

The Review Committee used the methods described in the Standard Evaluation Protocol 2015-2021 (SEP). This protocol aims to ensure a transparent and independent assessment process (see Annex 2: Criteria and scores of national protocol SEP).

The Dean asked the Review Committee to

1) Assess the quality, relevance to society, strategic targets of the School CARIM as well as the three research divisions (Blood, Vessels and Heart).
   a) Judge the performance of both CARIM and its research divisions on the three SEP assessment criteria below, taking into account current international trends and developments in science and society:

i) Research quality
ii) Relevance to society
iii) Viability

b) Provide a written assessment on each of the three criteria and assign CARIM and its three research divisions to a particular category (1, 2, 3 or 4*) in each case, in accordance with the SEP guidelines. (* 1 = World leading/excellent, 2 = Very good, 3 = Good and 4 = Unsatisfactory.)
c) Provide recommendations for improvement.

2) In addition, the Review Committee was asked to provide a qualitative assessment of CARIM and its three research divisions as a whole in relation to its strategic targets and to the governance and leadership skills of its management.
3) In accordance with the SEP, the following aspects were assessed in addition:
   a) PhD programme
   b) Research integrity
   c) Diversity

1.3 Working procedure of the Review Committee

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

- self-evaluation reports detailing the operation, management, research activities, outputs, and SWOT analysis of the School CARIM and its Research Lines; these self-evaluation reports were written in the format prescribed in the national standard evaluation protocol;
- internet-references of the selected papers and dissertations from each division to allow the Review Committee to examine in detail examples of published work;
- discussions with boards, managers, division leaders, PhD candidates, young talents, junior and senior investigators, Strategic Board and Research Council about the information provided.

The site visit was undertaken during the period October 23rd-25th 2019 and consisted of several components, which can be summarised as follows (full programme in Annex 3):

- An introduction to the School CARIM by Prof. Tilman Hackeng
- Sessions with all Divisions and programmes (leaders and key staff);
- A closed session with PhD candidates
- A closed session with young talents
- A closed session with junior investigators
- A closed session with senior investigators
- A closed session with the Strategic Board
- A closed session with the Research Council
- Meeting with the Management of the Heart+Vascular Center
- Site visits to The Maastricht Study
- Meeting with the Maastricht UMC+ Board. Prof. Albert Scherpbier, Dean FHML and vice-chair Maastricht UMC+ Board
- Meeting with the Executive Board of CARIM

During the assessment programme, the Review Committee decided to ask (and was provided with) additional details on financial structure.

The visit was concluded with an oral feedback session of the findings and preliminary conclusions of the Review Committee, attended by CARIM staff and researchers, the Dean and the Executive Board of CARIM.

The final report with the conclusions and recommendations was formulated according to the templates that have been provided to the Review Committee. The three criteria and especially the four-point scoring system, according to the latest version of the SEP, differ from those in prior SEPs and the scores from this review are therefore not directly comparable with the score of earlier reviews.

The draft report was presented to the Dean of the Faculty of Health, Medicine and Life Sciences to redress any (factual) errors.

2 Brief description of the School CARIM

CARIM is one of the six schools of the FHML of Maastricht University and is embedded within Maastricht UMC+. CARIM collaborates closely with the Heart+Vascular Center (HVC) of Maastricht UMC+. CARIM is one of the largest cardiovascular research institutes in Europe, producing more than 500 scientific articles and approximately 40 PhD dissertations per year.

CARIM's mission is to study general and individual mechanisms of cardiovascular disease in a curiosity-driven way, to apply findings to early diagnosis, mechanistic classification and individual risk stratification of cardiovascular disease, and to develop novel therapeutic concepts. By combining broad coverage of all major cardiovascular pathologies in blood, vessels, and heart with tight connections between fundamental researchers and clinicians, CARIM is able to evaluate and apply new findings, products and techniques in practice, often in collaboration with private and industrial partners.

Based on previous ERC recommendations, CARIM was restructured to stimulate better accessibility, connectivity and transparency in the international cardiovascular research community.

CARIM is now built around three comprehensive research Divisions of

- Blood (Division leader: Prof. Hugo ten Cate)
- Vessels (Division leader: Prof. Coen Stehouwer)
- Heart (Division leader: Prof. Harry Crijns)

comprising six programmes (**Figure 1**):

- Blood coagulation, venous thrombosis & bleeding;
- Atherosclerosis, arterial thrombosis & stroke;
- Vascular complications of diabetes & hypertension;
- Regenerative & reconstructive cardiovascular medicine;
- Structural heart failure and
- Complex arrhythmias

These six programmes together host 22 PI groups that represent specific research, infrastructural and financial units within CARIM.

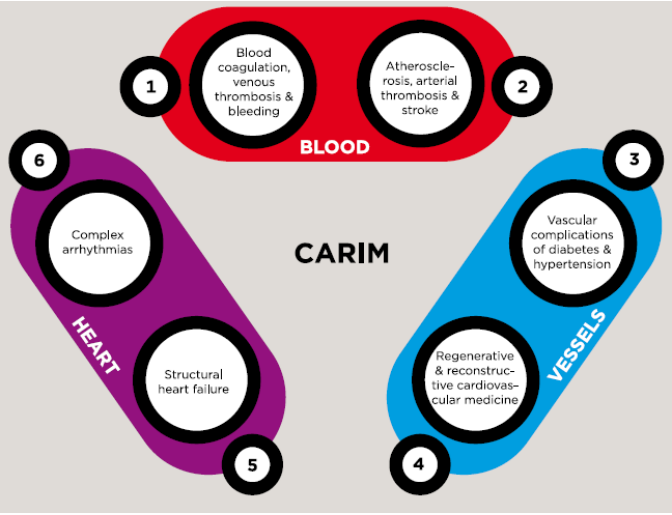

Figure 1: CARIM Divisions and programmes after restructuring

3 Assessment of the School CARIM

3.1 Self-evaluation Report

The self-evaluation report is a comprehensive, descriptive, qualitative, narrative report, and was very helpful in preparing for the ERC site visit. The first general impression of CARIM was positive, and the clear SWOT analysis was very much appreciated. Also appreciated was the separate binder in the self-evaluation that successfully illustrated societal impact of various research lines in the form of narratives.

The financial structure of CARIM in general and the divisions in particular was not immediately clear to the ERC, therefore additional information was requested – and provided for – during a face-to-face meeting with the managing director Wouter Hankel, together with the controller Debbie Engelen and the scientific director Tilman Hackeng. It was also noted by the committee that the current divisions do not overlap with the previous 'Themes' and that therefore longitudinal trends in the financial landscape were difficult to evaluate.

After reading the self-evaluation, the committee felt that the three divisions that make up CARIM operate as loose, individual columns of independent research lines. However, the in-depth scientific presentations on the second day of the visit were very insightful and gave comfort that there are indeed many interactions (with of course room for growth) between the divisions, and that the current divisional structure does not impede collaboration. Therefore, the self-evaluation report would have benefitted from more detailed information on how divisions collaborate and to what extent.

As said, the committee was impressed by the enthusiastic and inspiring presentations on day 2 of the site visit. In particular the long-term visions of the project leaders were clearly highlighted during the presentations and highly valued by the ERC.

3.2 Organizational aspects and governance

In general, as based both on the CARIM self-evaluation report and the impression during the three-days site visit, CARIM is a well-structured organisation with a clear governance structure, robust leadership skills of the management at all levels, a sound financial position and a clear infrastructure. Since the launch of the recommendations of the External Review Committee in 2014, several central adjustments of the CARIM organisation have taken place.

3.2.1 Governance structure

The actual Governance structure of CARIM consists of an Executive Board, membered by the Scientific Director, Leaders of the three divisions, the Managing Director and the chairman of the Strategic Board. In addition, CARIM consists of three main *Divisions* (Blood, Vessels and Heart). Within the Divisions, several *Programmes* are formed. *Advisory organs* to the Executive Board are all internal and consist of a Strategic Board, a Research Council and an Education Programme Committee.

In addition to an ERC that evaluates CARIM in intervals of six years, the institution should consider establishing an External Advisory Board that within intervals of 1-2 years gives recommendations on the various CARIM activities. An External Advisory Board could consist of representatives from other

national/international academic institutions, university hospitals, the life-science industry, NGOs (e.g. patients organisations), among others.

In the self-evaluation report there is only a sparse description of how – and by which means – the coordination and collaboration between divisions - Blood, Vessels and Heart - takes place. During the site-visit it was described that the Executive Boards meet on a monthly basis, however, a more detailed description of how collaboration between the three divisions are facilitated by the Executive Board is needed, both strategically and on a daily basis.

Finally, but most importantly, CARIM should describe a 'Strategic Annual Wheel', describing how the Executive Board, and the organisation, continuously work with CARIM-strategy through the year and how strategy and the financial reality and opportunities are connected.

3.2.2 Leadership Skills

Leadership Skills of the CARIM Management at all levels are good and robust. There is an obvious gender issue (see paragraph 3.6), and according to the self-evaluation report there is no clear succession plan for the top-leaders of CARIM. However, during the site-visit there was an indication that CARIM is working on recruiting internal successors, which – if executed – would end up with a better gender balance. Finally, CARIM should work more focused on recruiting its future leaders externally, both nationally and internationally.

3.2.3 Financial position

The financial position of CARIM is solid. As mentioned above (paragraph 3.2.1), CARIM needs to establish a 'strategic annual wheel' describing the tight connection between the strategic work and the monetary possibilities. CARIM should work more dedicated on winning international competitive grants, among many also more personal EU-/European Research Council-grants. CARIM has acted to heighten the success rate of grant applications through grant help and -support via the Research Council, with some impact on the grant application success rate, however, this work should be intensified.

3.2.4 Infrastructure

With respect to Infrastructure there are very good plans of how to strengthen several Core-facilities for the benefit for the whole organisation. It is not clear from neither the self-evaluation nor the site-visit on how CARIM train their researchers in, as a standard part of their grant applications, to apply for derived expenses of a research project, i.e. overheads that *de facto* cover the indirect expenses for technical personnel, biobanks, animal-housing, among others.

3.3 CARIM strategic targets

The general strategy of CARIM to reduce the number of PIs and to focus on core-strengths has been highly successful with better visibility, stronger science and more collaboration. Currently, there are no plans for reorganisation, but it will be important to keep a strong and strategic focus on succession for retiring PIs and top researchers. While some strategic recruitments were made by the Maastricht University to strengthen the ability for artificial intelligence, deep learning and data mining, these professors were not available at the visit and have part-time contracts. Both, the University and the Hospital started centres for data science which will benefit the strategy of CARIM.

One further strategic recruitment - which has been planned for several years now – is in microvascular function and a new hiring will strengthen this important core element of CARIM. The main strategy is based on strengthening and keeping the successful track, while filling gaps and

adjusting to changes of the field. Although future strategic priorities based on trends in the field and a SWOT-analysis of the institute were presented, these priorities do need to be planned in much more detail for the mid- and especially the long-term.

While there are trends towards more equality and diversity (see paragraph 3.6), there is no clear strategy to pro-actively overcome the current male-dominated situation, particularly at the PI level.

There is a clear strategy towards growing the next generation and developing in-house researchers towards future leaders. This seems very successful. It may be noteworthy, though that the career planning was unclear for some members of staff and a clearer long-term strategy of the whole of CARIM may also allow better understanding of this generation on how to invest and reach the next level.

Similarly to the planning of personnel, the strategic investments into core-lab structures or major equipment appears to be less based on an overarching vision but more on a per need basis. While this seems to work very well, it may be worthwhile to develop a strategy for potential large investments, which may also reduce the ability to fund the current wishes of the researchers.

The strategy for branding the Institution was regarded as weak in the past. A steep increase of PubMed-listed papers that mention CARIM indicates that this problem has been successfully addressed.

3.4 PhD programmes (graduate school)

The ERC is positive about the well-structured and broad content of the PhD programme which is of high quality. PhD students are satisfied with their educational programme. PhD students are offered many opportunities which enable them to flourish as excellent researchers with good career prospects. From a large variety of courses, PhD students can choose those which are most suitable and beneficial to their individual development. A required number of ECTS must be acquired during the PhD. Part of the ECTS can be dedicated to more personalized activities, such as teaching and presenting at conferences.

After the previous ERC visit, improvements have been made regarding structural monitoring of the progress of PhD students and the quality of their supervision. For this purpose, the CARIM Research Education and Supervision (CARES) plan was successfully introduced, followed by an improved version under the name ‘PhD-TRACK. For this plan, PhD students complete annual surveys. Although PhD students are positive about this plan in general, there is room for improvement. First, PhD students miss an appropriate introduction into the use of the web-based monitoring programme. This programme could therefore be made more user-friendly. Secondly, PhD students think an additional annual meeting with an independent guidance committee could be useful. Hence, the ERC would like to suggest introducing this into the PhD programme. Thirdly, although officially there is a planned dialog between the PhD-student and the supervisor at the end of the programme to discuss future career plans, it was evident that this important conversation was not consistently offered to all PhD students.

The average duration of the PhD track is considered as too long, i.e. 62 months until the thesis is approved. Regarding the extended duration of the PhD programme there was a mixed message to the ERC. In contrast to the belief that a short PhD is beneficial for a future career, it seems that good PhD students are stimulated to stay longer in order to build up a better portfolio for future grant submissions. This comes at a price because extending the PhD trajectory beyond four years requires

additional funding and loss of a monetary incentive. The ERC agrees with the monetary incentive, which was introduced to stimulate departments to let their PhD students finish on time, but also supports the option to stimulate the best students to prolong their programme in order to optimize output.

Please consider preferring quality over quantity, i.e. to lower the required number of publications to less than four. While this already seems possible, it is not openly communicated between supervisors and students.

Underperforming PhD students are filtered out in an early stage via a go-no-go decision in the first year, which is considered a good point in time by the ERC.

For new PhD students there is insufficient introduction in CARIM as a whole. PhD students agree that a solid introduction would be beneficial to adjust more easily to their new environment. Another suggestion is to couple new PhD students to senior PhD students for practical guidance, using a 'buddy-system'. Another remark of PhD students was that guidance is lacking for those PhD students who seek a career outside of academia. Connections of supervisors with experts outside of academia could be bundled and used for this purpose.

The number of PhD students guided by a single professor is sometimes very high. CARIM should consider to set a maximum limit on the number PhD-students a supervisor can have. The ERC emphasizes that the compliance with the programme should also be fully enforced for external PhD students.

Overall, the ERC is very pleased with the current PhD programme and its progression over the last years. The ERC is hopeful that application of the suggested improvements will make the PhD programme even stronger.

3.5 Research integrity

According to the self-evaluation report, and as mentioned at the site-visit, CARIM is in the process of establishing a code-of-conduct policy with regard to research integrity. The impression is that this policy is predominantly directed towards PhD students and younger researchers. A good and robust policy regarding research integrity should 'walk on two legs', i.e. a prevention part and a part focused on how suspicion of a breach of research integrity is handled within the organisation. The continuous education on research integrity should comprise all researchers from the PhD student to the most senior professors. With respect to the second part CARIM should consider to establish a system with access to and general awareness of the existence of an independent 'ombudsman'.

Aspects regarding the protection of research data and research materials have been adequately explained to the ERC, should be more comprehensively described in the next self-evaluation.

A topic, which is not directly linked to integrity is the assignment of senior authorship. It was not entirely clear for the early career scientists, when he or she could serve as senior author. The option of claiming senior authorship is very important for the future positioning of an individual in a competitive research environment. It would bring more empowerment and transparency for early career professionals to openly discuss this and set rules.

3.6 Diversity and equality

Social inclusion and diversity are not only important aspects of fairness, but also a means to ensure social cohesion. The establishment of diversity and inclusiveness means that people working in CARIM should represent the composition of the society as a whole. CARIM supports, in its PhD and other programmes, the training of persons of different race, colour and gender. The ERC did not have an overview of the whole CARIM staff, but doubtlessly students and employees come from different regions and countries.

With regard to gender balance, it is important to note that there was an equal distribution among PhD students. However, as researchers mature, i.e. from junior to senior and further to the Strategic Board and Research Council, women become a minority. During the meetings of the ERC with early and also more advanced career professionals, women felt that they were treated equally with regard to the opportunities they were offered. However, there remains the fact that "women get lost" especially at the level of the Executive Board and the Research Council. The lack in gender diversity must be tackled pro-actively and milestones should be formulated. It is important not to overburden those women, who already have entered leadership positions, but to really increase the number of women in leadership boards and positions. This is recognised by the Executive Board and the ERC was informed that new professor positions are planned to be filled in a 50:50 ratio between women and men.

3.7 Performance

3.7.1 Research quality

The overall productivity and quality of research at CARIM is ranked at 2 (very good) with examples of 1 (excellent).

CARIM addresses timely research questions relevant for better mechanistic understanding of cardiovascular disease, identification of novel therapy and diagnostic targets and improvement of clinical care. In the written self-evaluation as well as in the various presentations during the site visit the ERC saw examples of exciting science and a convincing long-term development of concepts that have the potential to better understand and address cardiovascular disease and to prevent it. The research in the three divisions span from novel mechanisms of thrombo-inflammation in atherosclerosis, myocardial inflammation in atrial fibrillation and inflammation in dilated cardiomyopathy over vitamin K-based treatment of vascular and aortic valve calcification to clinical studies on stroke and renal protection that were published in high-impact journals and directly changed clinical guidelines, e.g. the MrCLEAN and AMACING trial.

The various bibliometric indices provided in the self-evaluation report show a group of highly productive researchers with an average h-index of 50 and examples of researchers with an outstanding productivity. The quantitative publication output has been essentially stable over the past 6 years (~550 papers/year). While the mean journal impact factor of CARIM publications increased over the past 6 years (from 4.9 in 2016 to 5.6 in 2018), the percent papers in the top-10 percent ranking journals appears to slightly decrease from ~32% (2013) to ~28% (2017/2018), similar to the average number of citations per paper (CI, which went down from 25 [2013-2016] to 12 [2015-2018]). The indices should not be viewed as directly indicating research quality, but clearly show that CARIM´s research is published at an internationally highly competitive level, comparable with benchmark institutions such as Harvard or Imperial College London. The trend in the relative citation rate should be observed.

The staff of CARIM is burdened by a teaching load of 50%: The first money stream labelling on research is limited to 50% (0.5 fte) and the staff can supplement this 0.5 fte research labelling with teaching labelling or research labelling from second or third money stream. This makes it difficult for individual researchers to function at a level where they can compete effectively for grants from the European Research Council. In case sufficient funds from second or third money streams are lacking, it is recommended that CARIM, on an ad hoc basis, reserves part of its yearly strategic budget to lower the teaching load of prime candidates for European Research Council funding.

Research groups at CARIM are deeply embedded in national and EU-wide research activities as seen from their leading role or participation in NWO, CVON and EU Horizon 2020 networks. A weakness is the relatively low number of European Research Council grants. On the other hand, CARIM researchers received a high number of national and international awards (29 Division Blood, 7 Vessels, 19 Heart) and invitations for lectures, exemplifying the strong visibility of cardiovascular science of the CARIM School. Strength is seen in the convincing integration/partial recruitment of external expertise on PI level, the well-developed interaction with neighbouring research consortia such as Interreg Meuse Rhine and Aachen University and strong links to pharmaceutical and device industries.

International research trends in genomic medicine, big data, biostatistics, artificial intelligence, personalized medicine, imaging, single cell analyses, next generation RNA sequencing and noncoding RNAs, regenerative medicine, human induced pluripotent stem cells, CRISPR/Cas9 gene editing and others are considered at CARIM and have led to some of the recent recruitments and establishments of technical core facilities. Data management capacities have been improved since the last evaluation, but remain a bottleneck. The Maastricht study provides an excellent basis for big data analyses, but this will require reliable financial perspectives. The establishment of the Faculty of Science and Engineering should be taken as an opportunity for increased collaboration, which appears to be the direction the CARIM School takes, e.g. by the double appointment of two PIs.

Establishment of a core facility concept was mentioned by the Maastricht University leadership and in the self-evaluation report (“research platforms”), but details did not become clear during the site visit. Given the speed of development in the respective fields, the cost of instrumentation and the need for highly specialized and experienced personnel to master the respective techniques a better defined concept should be developed and implemented.

3.7.2 Relevance to society

The societal relevance is ranked 1 (excellent).

The ERC was impressed by the number of spin-off companies and other activities of CARIM researchers that have societal impact. Annex 8 of the self-evaluation lists a total of 16 spin-off companies of which 9 were founded in the evaluation period 2013-2018. Even though details of the individual successes could not be evaluated, the number and documented success of examples such as MosaMeat were considered excellent. Membership of CARIM researchers in several guideline committees and policy advisory boards shows recognition by important societal groups.

CARIM researchers are active in the organisation of public events such as the World Thrombosis Day or Walk and cycle with your doctor, guidance for patients with cardiovascular disease (e.g. CATCH ME for AF), a vitamin K cookbook and the establishment and continuous development of web-based heart model (CircAdapt) with international reachout.

CARIM-directed clinical studies have impact on clinical guidelines as mentioned above.

3.7.3 Viability

Viability is ranked 2 (very good).

Restructuring of the research themes with many PIs to the three Divisions Blood, Vessels and Heart with fewer PIs was considered a strength. Collaboration inside and between the Divisions remain a challenge as does the interaction with the HVC (clinics), but it was felt that CARIM is on a successful path, which is facilitated by an excellent collaborative spirit, flat hierarchies and strong and dynamic leadership.

Gender equality remains a challenge and is currently clearly beyond own and national goals. CARIM leadership presented ideas for changing this situation and is strongly advised to continue their efforts to integrate more of the many excellent women scientists from inside and from outside of CARIM. Viability of the school will require further input from outside, not at last regarding to the challenges of new technologies.

Generational change is a threat and an opportunity in several institutes and clinics, but concepts were presented how to manage, in particular the HS-BAFTA initiative is considered very positive by the ERC.

3.8 Recommendations for improvement

The future viability of the research within CARIM will benefit from the appointment of talented researchers to both junior and more senior positions. In doing so, the leadership of CARIM must continue to pay attention to diversity and to the balance between personnel who were trained within CARIM and those who have a history in other institutions. This should result in a more well-balanced female-male ratio, especially in leadership positions, and CARIM is encouraged to be truly proactive in order to achieve this goal.

The appointment of outsiders will ensure sufficient rejuvenation within the research lines of CARIM, and preferably all permanent CARIM positions should be filled in an open competition. Therefore, not all talented CARIM-trained personnel can remain within the institute, and it would be helpful if a well-described and transparent career path would be put in place, in particular for senior post-docs, and communicated in all parts of the organization. In this context, also more attention should also be paid to helping PhDs and post-docs find attractive positions outside of CARIM.

The career of individual CARIM researchers is in part dependent on their publication record. The interpretation of a publications record, rightly or wrongly, also takes first, middle and last authorship into account. CARIM is encouraged to draw up a ‘position paper’ that provides authorship recommendations that especially benefit more junior researchers.

The strategic decision making of the Executive Board is supported by a Strategic Board on which senior representatives from all divisions serve. The ERC agrees with the important supportive role of the Strategic Board, but recommends that membership of this board will be limited in time so that turnover is ensured. In addition, installing an External Advisory Board could be considered. Finally, but most importantly, CARIM should describe a Strategic Annual Wheel, describing how the Executive Board, and the organisation, continuously work with CARIM-strategy through the year and how strategy and the financial reality and opportunities are connected

A Research Council also supports the Executive Board of CARIM, but in a more indirect role that is limited to helping CARIM researchers to be(come) more successful in obtaining grants. It is

recommended that the Research Council also takes on a role in collecting and spreading more information on grant opportunities that are open to CARIM researchers.

The possibility to collect, analyse, and translate “big data” will benefit several of the major research themes within CARIM, and implementation will need coordination with the other Schools/Institutes within the FHML. It is recommended that the CARIM Executive Board takes on a pro-active role to ensure effective integration of “big data” facilities. The ERC also strongly advises continued funding for the Maastricht Study.

The ERC was pleased by the well-organized PhD programme. It appears that an independent supervision of the PhD track by staff members not directly involved in the work, was often not implemented. It is recommended to enforce this recommendation more strictly. Similarly, supervision of so-called outside PhDs might benefit from more strict enforcement of the rules and regulations of the PhD programme.

4 Assessment of the Divisions

4.1 Blood

4.1.1 General remarks

This research theme's name was changed from "Thrombosis and Haemostasis" into "Blood". The division Blood has two substructures: programme 1 called "Blood coagulation, venous thrombosis and bleeding" and programme 2 "Atherosclerosis, arterial thrombosis and stroke".

Programme 1 is coordinated by four PIs, all from the Department of Biochemistry and one with a clinical background with an affiliation also at the Internal Medicine. Programme 1 investigates basic mechanisms of anti-coagulant proteins and platelets, the genetic alterations of coagulation factor functions and has a focus on chemical protein synthesis. Furthermore, it includes a specific programme on clinical thrombosis research.

Programme 2 focusses on thrombo-inflammation and atherosclerosis, vitamin K-dependent proteins and their role in vascular calcification, and ischemic stroke to provide CARIM with research in cardiovascular imaging. This is a division with very broad research focuses, from basic to clinical research topics.

4.1.2 Research Quality

The research quality is ranked as 2 (very good), based on a good record of publications with increasing productivity, however, the citation index has gone down.

The six PIs have an impressive publication record and are internationally very well known. There are two, who also have appointments at other institutions. Their actual role in CARIM, and the extent to which CARIM can claim ownership of the scientific output of each of the PIs was not clear to the ERC. The PI's and other members of this division have a solid international academic reputation and are active in various scientific and editorial boards. The excellence of this division is also demonstrated by invited lectures at numerous international congresses.

This division also has a focus on bleeding disorders. One research group is predominantly involved in this area, which is important, as bleeding is an essential part of "Thrombosis and Haemostasis". Representatives of this research team are widely recognized and closely linked to other groups in the international scientific community.

4.1.3 Relevance to society

The relevance to society is ranked as 1 (excellent), based on the recognition of members of this division and their interaction with various scientific national and international boards, serving as chairs or members of boards.

As for their roles in scientific journals, several members of these programmes serve as editors, section editors or associate editors.

Three spin-offs and a biotechnology company have been founded. This enables to translate academic research into economic bodies that create jobs and increase the economic output.

Another important and maybe the most relevant societal impact is the impact on an individual's health and the health in a population. The research focus of these programmes is likely to improve health and quality of life, e.g. regarding prevention of thrombosis, prevention and improving post-

thrombotic syndrome and prevention and better outcomes in patients with acute ischemic stroke and atherosclerosis.

4.1.4 Viability

The viability is ranked as 1 (excellent), based on:

- The effective scouting for external talents and professorships.
- Investments in infrastructure in the areas of gene repair
- The spin-offs can also be seen as a sign of viability of the whole research area

This present Division Blood does not entirely overlap with Theme I “Thrombosis and Haemostasis”, which was last evaluated in 2014. The change in the name and composition of this theme allows more inclusiveness and this division now covers many different clinical and research areas. Consequently, it might be more difficult to have strong interactions between the various research groups. Through the presentations at the ERC meeting some aspects were highlighted and were very well presented, while other projects were not as clearly visible.

4.1.5 Recommendations for improvement

The Maastricht Study, together with the biobanks from cohorts of patients with various diseases, could allow the division Blood to participate more actively in hypothesis-generating research, but also in interventional studies. Such translational aspects of the activities of the division should be further expanded, specifically in the fields of venous thrombosis, acute stroke and atherosclerosis. Deep geno- and phenotyping of thrombophilia and bleeding tendency could advance the understanding of these diseases and result in novel treatment options. Sound knowledge in handling large data sets and specific knowledge in the evaluation and interpretation of geno- and phenotyping will remain important. The novel radio-biochemical cardiovascular imaging offers the possibility of a multidisciplinary approach.

4.2 Vessels

4.2.1 General remarks

The Division Vessels was created from the former Theme III: Vascular Biology and comprises the two programmes “Vascular complications of diabetes & hypertension” and “Regenerative and reconstructive cardiovascular medicine”. The overall research programme is clinically inspired to prevent and treat cardiovascular diseases. It is well established in CARIM and encompasses several groups with international visibility. It addresses a relatively wide range of research subjects with a focus on diabetes and its consequences on micro-vascular function in the brain and the retina as well as non-alcoholic fatty liver disease. A particular strength is the Maastricht Study, which provides a unique resource for the identification of risk factors, mechanisms and consequences of diabetes with a specific focus on microvascular function. The leadership pursues a strong interdisciplinary approach to tackle common and intersecting research questions.

4.2.2 Research quality

The research quality of the division Vessels is ranked as 2 (very good).

The research programme has a strong epidemiological, clinical and translational focus, but also contains very robust basic research programmes. The presentations of the core researchers as well as the written documents demonstrated a range of excellent projects around the role of macrophages in insulin resistance, mechanisms of non-alcoholic fatty liver disease and early detection of cerebral small vessel disease by MRI techniques in association with cognitive dysfunction. Strengths include a strong clinical and epidemiological basis with the Maastricht Study as the most visible example. Some areas of the Division reach world-wide excellence. The numbers of published papers have decreased during the past six years, while bibliometric indices remained at a very good, but not top level; no comparison with indices of other Dutch cardiovascular research centers was available. Integration into the HVC could be extended as well as the integration in larger research consortia and EU networks. The link between the programme on regeneration and the rest of the Division is not entirely clear.

4.2.3 Relevance to society

The relevance to society of the division Vessels is ranked as 1 (excellent).

Several aspects of the research and the publications from the Division have societal impact. This includes heavy media interest in the tissue-engineered food programme, the Maastricht Study, a series of European Vascular Surgery Courses and a databank on Advanced Glycation End products. Several patents in the imaging and device area as well as three spin-off companies originating in the tissue engineering group add to the impact. One of the latter has had a very successful start after foundation in 2015 and successful series A funding in 2018.

4.2.4 Viability

The viability of the division Vessels is ranked as 1 (excellent).

The performance of the Division Vessels is strong. Better integration of research programmes and more efforts in reaching a better gender equality are warranted. Overall, the viability of the Division was considered excellent.

4.2.5 Recommendations for improvement

Most of the research lines within the Division Vessels have a high potential for medical impact. Increasing hypothesis-driven research questions with in depth molecular and mechanistic analysis would further strengthen the Division's potential to publish in high-ranked Journals and identify innovative therapeutic targets. Division Vessels has already initiated efforts to develop mathematical and computational modeling of complex data that will increase their capacity to understand the molecular mechanisms of cardiometabolic diseases; these efforts need to be further encouraged. By the same token, development of basic research in microcirculation and inflammation of its microenvironment requires further support from CARIM to fully exploit the potential of the different clinical studies, including the Maastricht study.

Many of the research lines within CARIM are based on solid and very focused conceptual frameworks, and the resulting research questions are largely hypothesis driven. This appears to be less dominating in the research lines within the Division Vessels. The ERC therefore recommends developing also in this Division clearer conceptual frameworks to guide future research. In this context, the efforts of Division Vessels to pursue investments in microvascular biology and biology of ageing are strongly encouraged.

4.3 Heart

4.3.1 General remarks

The Division Heart is well established and a strong partner within CARIM. Both, by leadership as well as involved researchers and topics, the Division is well connected to the hospital and clinical medicine. The current leadership is strong and strategic; plans for handover due to retirement are in place.

4.3.2 Research quality

The research quality of the division Heart is ranked as 2 (very good).

The presentations of core researchers as well as the written feedback demonstrated a range of very good future leaders, strong connection with clinicians and strong science. While not all areas of the Division reach world-class excellence, some aspects of the work are to be regarded to be within the absolute top. The focus of the research topics is well visible and also strongly embedded in the strategy of the clinical work. The publication output is excellent and stable over the past years with bibliometric indices of excellence.

4.3.3 Relevance to society

The relevance to society of the Division Heart is ranked as 1 (excellent).

Especially through the work on atrial arrhythmia the Division is highly relevant to society and public health, leading a research area of immense societal burden. Via work at charities and professional societies as well as by participation in and organisation of local and national events for patients, the division connects well with the general public. Several members of the division play important and highly visible roles in the European leadership and are well known and respected within the European community and beyond.

4.3.4 Viability

The viability of the Division Heart is ranked as 1 (excellent).

The reviewers were impressed by the high number of spin-offs and strong connection with industry. The viability of the division is strong, as the research infrastructure, the second and third generation of researchers and the connection to the clinical departments in the hospital are strong and durable. The chosen research topics are highly relevant for now and the foreseeable future.

The SWOT analysis provided by the Division was regarded as a fair presentation of strengths, weaknesses, opportunities and threats. While handover to the next generation has been planned, the retirement of several strong researchers in the Division remains a threat.

4.3.5 Recommendations for improvement

The opportunity for a better link to a strong science department should be exploited. The succession of current leaders should be planned.

4.4 Table: Overall quantitative assessment of the school and divisions

	Quality	Relevance to society	Viability
School of CARIM	2	1	2
Blood	2	1	1
Vessels	2	1	1
Heart	2	1	1

5 Annexes

5.1 Annex 1: External Review Committee

Pieter Reitsma (chair)
Title: Professor of Thrombosis and Hemostasis
Affiliation: Einthoven Laboratory, Leiden University Medical Center, Building 1
Email address: p.h.reitsma@lumc.nl

Chantal Boulanger
Title: INSERM Research Director, Paris, France
Affiliation: Université de Paris, Paris - Cardiovascular Research Center at HEGP; INSERM - U970
Email address: chantal.boulanger@inserm.fr

Thomas Eschenhagen
Title: Professor of Pharmacology
Affiliation: Center for Experimental Medicine, Institute of Experimental Pharmacology and Toxicology, University Medical Center Hamburg Eppendorf
Email address: t.eschenhagen@uke.de

Allan Flyvbjerg
Title: CEO and Clinical Professor
Affiliation: Steno Diabetes Center Copenhagen, the Capital Region of Denmark, Copenhagen, Denmark and University of Copenhagen, Copenhagen, Denmark.
Email address: allan.flyvbjerg@regionh.dk

Eike Nagel
Professor for Cardiac Imaging, Institute for Experimental and Translational Cardiovascular Imaging, DZHK (German Centre for Cardiovascular Research) Centre for Cardiovascular Imaging, University Hospital Frankfurt am Main, Germany
Email address: Eike.Nagel@kgu.de

Ingrid Pabinger
Title: Professor of Haemostaseology
Affiliation: Clinical Division of Haematology and Haemostaseology, Department of Medicine I, Medical University of Vienna
Email address: ingrid.pabinger@meduniwien.ac.at

Carolina Touw
Title: PhD student
Affiliation: Leiden University Medical Center, Training Epidemiologist-B (in combination with PhD trajectory)
Email address: c.e.touw@lumc.nl

Dr. Ir. Roelinka Broekhuizen
Self Employed: Nutrition, communication and web
Email address: roelinka_broekhuizen@yahoo.com

5.1.1 Prof. Dr. Pieter Reitsma

Pieter Reitsma is an expert in blood coagulation and was until 2016 head of the department of Thrombosis and Haemostasis of the LUMC and of the Einthoven Laboratory for Regenerative and Vascular Medicine. He has always worked at the interface of fundamental science and clinical applications. In the early stage of his career he contributed to the experimental animal and in vitro work which was needed to bring the bisphosphonate APD to the clinic to successfully treat patients with destructive bone disease. APD together with a series of related compounds are still on the market. Later he turned to the field of Haemostasis and Thrombosis where he made seminal contributions that made him expert in the genetics of Haemostasis and Thrombosis. The test for factor V Leiden that he co-discovered is the most commonly performed genetic test in the world. Pieter Reitsma has more than 400 PubMed publications, mostly in high ranking international journals. Just his top five publications have been cited more than 8,500 times. Pieter Reitsma is former member of the Scientific Advisory Board of the Dutch Heart Foundation and a former member of the Thrombosis and Vascular Biology committee of the American Society of Haematology. He is also former member of the Council of the International Society of Thrombosis and Haemostasis, and past Editor in Chief of the Journal of Thrombosis and Haemostasis. Pieter Reitsma chairs two institutional advisory boards, the CARIM external review committee (2015-present), Maastricht, Netherlands, and the scientific advisory board of K.G. Jebsen - Thrombosis Research and Expertise Centre (TREC), Tromso, Norway (2015-present). Pieter Reitsma is co-founder of Amsterdam Molecular Therapeutics (AMT, now UniQure), a biotech start-up specializing in gene therapy. After retiring in 2016, Pieter Reitsma started a new drug company named VarmX. The lead drug product of this company is VMX-C001 that is able to prevent and stem bleeding in patients who are taking direct oral anticoagulants.

5.1.2 Dr. Chantal Boulanger

Chantal M. Boulanger received her doctorate in Pharmacy at the University of Nancy, France in 1983 and her PhD at the University of Strasbourg in 1986. She was appointed Research Director at *Institut National de la Santé et de la Recherche Médicale* (Inserm) in 1995, where she has been leading an Inserm research team since 2004. Starting beginning of 2019, she has been appointed Director of the Paris Cardiovascular Research Center (PARCC) and co-director of the Physiopathology and cell biology department of the BioSPC Doctoral School at the University of Paris; she is also a member of the Scientific Council of INSERM. Chantal Boulanger authored 180 publications (web of science h-index: 63,> 13000 citations, 68 citations / publication on average), 15 chapters of books, 7 patents, 40 international conferences invited since 2009, and a MOOC Extracellular vesicles and cardiovascular diseases (ISEV 2019). The journal Circulation Research recognized her as an opinion leader in Cardiovascular Science (https://www.ahajournals.org/doi/10.1161/CIRCRESAHA.117.311569). Over the past twenty years, her team has been investigating extracellular vesicles as a biomarker of endothelial dysfunction and intercellular mediator during cardiovascular pathologies. Her current research aims to understand the mechanisms regulating the synthesis and the biological effects of extracellular vesicles in the cardiovascular context in order to develop biosynthetic vesicles mimicking the beneficial effects or inhibiting the deleterious effects of biological vesicles and thus to slow down the development cardiovascular pathologies. The latest awards she received are ATVB-AHA Special Recognition Award in Thrombosis (2014), the Lucie & Olga Fradiss Award from the *French Society of Cardiology* (2017) and the Jean-Paul Binet Award from the *Fondation pour la Recherche Médicale* (2019).

5.1.3 Prof Thomas Eschenhagen

Thomas Eschenhagen studied Medicine at Hannover where he also completed his MD Thesis and trained for 3 years in Cardiology before starting his specialization in Experimental and Clinical Pharmacology at the University of Hamburg, where he completed a postgraduate study of Molecular

Biology in 1992. He served as Director of Clinical Pharmacology at the University of Erlangen (1998-2002) and, since 2002, is Director of the Department of Experimental Pharmacology and Toxicology at the University Medical Center Hamburg Eppendorf. Since 2011, he serves as Chairman of the Board of Directors of the German Centre for Cardiovascular Research. He is member of the German Academy of Science Leopoldina (2008) and President-Elect of the International Society for Heart Research (ISHR). His research is funded internationally through grants from various public and private bodies, including an ERC AG. He published >280 full papers (>13,500 citations, H index 63) and >30 reviews or chapters in textbooks including the leading pharmacology textbooks in Germany and the Goodman & Gilman. His research focusses on molecular cardiology with a focus on adrenergic control of the heart, stem cells and tissue engineering, a technology he pioneered in 1994.

5.1.4 Prof. Allan Flyvbjerg

Allan Flyvbjerg graduated from Aarhus University, Denmark in 1986. He defended his thesis (DMSc) in 1993, became specialist in Internal Medicine and Endocrinology in 1999, Chief Physician in 2001, Professor in Experimental Medical Research in 2005 and Professor in Endocrinology (Chair) in 2009 at the Department of Endocrinology/Internal Medicine at Aarhus University Hospital and the Medical Research Laboratories, Department of Clinical Medicine, Aarhus University, Aarhus C., Denmark. From 2010-2016 he was Dean at the Faculty of Health at Aarhus University, Denmark. Since October 2016 he has been CEO of Steno Diabetes Center Copenhagen (SDCC) at the Capital Region of Denmark, Copenhagen, Denmark and since November 2016 Clinical Professor at the University of Copenhagen.

5.1.5 Prof. Eike Nagel

Eike Nagel has a longstanding history of research, teaching and training in cardiovascular magnetic resonance. He has established and translated several CMR application and imaging techniques into clinical practice. He has published over 500 imaging-related publications and has authored several clinical guidelines, e.g. on standardized image acquisition, standardized reporting and standardized quantification for cardiovascular magnetic resonance. He is one of the founding members and Past President of the Society for Cardiovascular Magnetic Resonance (SCMR). He leads the Institute for Experimental and Translational Cardiovascular Imaging and DZHK Centre for Cardiovascular Imaging in Frankfurt in his role as DZHK Professor (dzhk.de/forschung/dzhk-professuren/). In his clinical position he leads the Interdisciplinary Cardiovascular Imaging Service and Consultant Cardiologist in the Departments of Cardiology and Radiology at the University Hospital Frankfurt am Main, offering a state-of-the art clinical service and clinical translation of research findings into clinical routine.

5.1.6 Prof. Ingrid Pabinger

Ingrid Pabinger-Fasching is the Professor of Haemostaseology at the Clinical Division of Haematology and Haemostaseology, Department of Medicine I, Medical University of Vienna, Vienna, Austria. She is the Director of the Haemostaseology outpatient department and has been Director of the Haemophilia Care Center in Vienna since 1998.

After graduating as a Medical Doctor in Vienna, Austria, Professor Pabinger-Fasching went on to train in Internal Medicine, specialising in haematology and oncology in 1999. She started her career at the Department of Internal Medicine I, Medical University of Vienna, and has been in charge of a scientific laboratory with focus on thrombosis research and bleeding disorders since 1990. She has spent research stays in Leiden, NL. Her specific fields of expertise include hereditary and acquired thrombosis risk factors, haemophilia treatment and acquired haemorrhagic diathesis, and specific haemostaseologic problems in critically ill patients.

Professor Pabinger-Fasching has been Principal Investigator for more than 50 clinical trials and Coordinating Investigator in four international studies. She has published over 410 papers in peer-reviewed journals, mainly in the fields of thrombosis, haemostasis, haematology and internal medicine, as well as working as Associate Editor for several journals, e.g. Haematologica and the Journal of Thrombosis and Haemostasis.

Professor Pabinger-Fasching acted as President of the annual meeting of the German, Austrian and Swiss Society of Thrombosis and Haemostasis (GTH) in 2009 and as Vice-President of the International Society on Thrombosis and Haemostasis (ISTH) Congress in Berlin in 2017. She has been involved in several international and national scientific societies throughout her career, including the Board of the GTH, the Board of the European Hematology Association (EAH), where she also chaired the Nomination Committee for Board Members and international and scientific committees of the American Society of Hematology (ASH). For the period 2016-2018 she was President of the ISTH Society.

5.1.7 Carolina Touw

Carolina Touw studied medicine at the Erasmus University of Rotterdam. In 2017 she obtained her medical doctor's degree. Shortly after, she started as PhD candidate at the Department of Clinical Epidemiology of Leiden University Medical Center. Her PhD involves a collaboration with the Department of Orthopaedic Surgery. She studies the mechanism and prediction of venous thromboembolism in orthopaedic surgical patients. Additionally, Carolina is currently trained as clinical epidemiologist at the LUMC.

5.1.8 Dr. Roelinka Broekhuizen

Roelinka Broekhuizen did her PhD in Maastricht at the school NUTRIM. She works as an independent consultant, now working for the Dutch Society of Nutritional Sciences (NAV), SMBWO, Nutritional Science Days and Louis Bolk Institute. She has been hired as an independent Secretary of the Review Committees of Nutrim/VLAG in 2015, for CAPHRI in 2017 and now for CARIM.

5.2 Annex 2: Criteria and scores of national protocol SEP

Criterion 1: Research quality
The committee assesses the quality of the chair group's research and the contribution that research makes to the body of scientific knowledge. The committee also assesses the scale of the chair group's research results (scientific publications, instruments and infrastructure developed by the group, and other contributions to science). The following elements are to be considered in assessing this criterion:

- scientific quality
- productivity to the scientific community (in relation to the volume of the tenured scientific staff)
- the academic reputation of the group
- the strategy to provide the output at the highest relevant level possible

Criterion 2: Relevance to society
The committee assesses the quality, scale and relevance of contributions targeting specific economic, social, or cultural target groups, of advisory reports for policy, of contributions to public debates, and so on. The point is to assess contributions in areas that the chair group has itself designated as target areas. The following elements are to be considered in assessing this criterion:

- a narrative in which the group demonstrates its relevance for society
- research products for societal target groups such as
  - professional publications and outreach to the general public
  - other research output to society
- use of research products by societal groups such as
  - patents, licences, training courses
  - projects in cooperation with societal partners (European Union, Top-sectors, international funds)
  - contract research (including consultancies), also co-publications and use of facilities
  - present jobs of alumni
- demonstrable marks of recognition by societal groups such as demonstrated by
  - advisory reports for the government
  - media exposure as presentations on radio / TV, invited opinion articles etc.
  - membership societal advisory boards

Criterion 3: Viability
The committee assesses the strategy that the chair group intends to pursue in the years ahead and the extent to which it is capable of meeting its targets in research and society during this period. It also considers the governance and leadership skills of the chair group's management. The following elements are to be considered in assessing this criterion:

- leadership of the chair
- (scientific) visibility and recognition
- research vision and strength of the RLs
- innovative strength
- strategic choices and decisions
- composition of the group (expertise, people)
- acquisition capacity

The meaning of the scores for the three main assessment criteria:

Score	Meaning	Research quality	Relevance to society	Viability
1	Excellent / world leading	One of the few most influential research groups in the world in its particular field	An outstanding contribution to society	Excellently equipped for the future
2	Very good	Very good, internationally recognized research	A very good contribution to society	Very well equipped for the future
3	Good	Good research	Makes a good contribution to society	Makes responsible strategic decisions and is therefore well equipped for the future
4	Unsatisfactory	Does not achieve satisfactory results in its field	Does not make a satisfactory contribution to society	Not adequately equipped for the future

5.3 Annex 3: Programme CARIM Review 2019

Wednesday 23 October 2019

Morning/early afternoon	Arrival members External Review Committee in Maastricht NH Hotel, Forum 110, 6229 GV Maastricht	
12.50	Pick-up members at NH Hotel by Prof. Tilman Hackeng	
13.00-14.30	**Closed session** of the External Review Committee, including lunch Committee Members: - Prof. Pieter Reitsma - Prof. Allan Flyvbjerg - Prof. Ingrid Pabinger - Prof. Thomas Eschenhagen - Dr Chantal Boulanger - Prof. Eike Nagel - Drs. Carolina Touw - Dr Roelinka Broekhuizen (secretary)	UNS 50 1.366
14.30-15.00	Installation External Review Committee members by Prof. Albert Scherpbier, Dean of the Faculty of Health, Medicine and Life Sciences (FHML). In presence of Prof. Tilman Hackeng (Scientific Director) and Wouter Hankel (Managing Director)	UNS 50 1.366
15.00-16.00	Introduction to CARIM by Tilman Hackeng - Organisation - Finances - Input - Output - Highlights - Talent policy	Blauwe zaal
16.00-16.30	Presentation Division Blood by Prof. Hugo ten Cate	Blauwe zaal
16.30-17.00	Presentation Division Vessels by Prof. Coen Stehouwer	Blauwe zaal
17.00-17.30	Presentation Division Heart by Prof. Harry Crijns	Blauwe zaal
17.30-18.00	Discussion	Blauwe zaal
18.15	Taxi to Chateau Neercanne	
18.30	Dinner at Chateau Neercanne Invitees: - ERC - Prof. Albert Scherpbier, Dean FHML - Prof. Michael Jacobs, Head HVC - Prof. Tilman Hackeng, Scientific Director CARIM - Prof. Hugo ten Cate - Prof. Coen Stehouwer - Prof. Harry Crijns - Prof. Uli Schotten - Wouter Hankel	Cannerweg 800, 6213 ND Maastricht

Thursday 24 October 2019

9.00-9.20	Presentation Division Blood Leon Schurgers	Blauwe zaal
9.20-9.40	Presentation Division Blood Ingrid Dijkgraaf	Blauwe zaal
9.40-10.00	Presentation Division Blood Judith Sluimer	Blauwe zaal
10.00-10.20	Presentation Division Vessels Kristiaan Wouters	Blauwe zaal
10.20-10.40	Presentation Division Vessels Julie Staals	Blauwe zaal
10.40-11.00	Presentation Division Vessels Martijn Brouwers	Blauwe zaal
11.00-11.30	Coffee break	Blauwe zaal
11.30-11.50	Presentation Division Heart Joost Lumens	Blauwe zaal
11.50-12.10	Presentation Division Heart Blanche Schroen	Blauwe zaal
12.10-12.30	Presentation Division Heart Rachel ter Bekke	Blauwe zaal
12.30-13.30	**Closed session** ERC (including lunch) about finances with Wouter Hankel, Tilman Hackeng and controller	UNS 50 1.366
13.30-14.30	***Closed session*** *PhD candidates, including Marc van Bilsen (coordintor PhD programme)*	Flendrigzaal MUMC+
14.30-15.00	***Closed session*** *young talents*	Flendrigzaal MUMC+
15.00-15.30	*Coffee break*	Flendrigzaal MUMC+
15.30-16.00	***Closed session*** *junior investigators*	Flendrigzaal MUMC+
16.00-16.30	***Closed session*** *senior investigators*	Flendrigzaal MUMC+
16.30-17.30	**Closed session** ERC	UNS 50 1.366
17.45	Taxi to evening venue	
18.00-19.00	Reception and poster session	Ipanema, Bonnefantenmuseum
19.00-22.00	Informal (buffet) dinner with CARIM scientific staff, technical staff and PhD students	Ipanema, Bonnefantenmuseum

Friday 25 October 2019

9.00-9.30	**Closed session** Strategic Board - Uli Schotten, chair - Aaron Isaacs - Paul Volders - Judith Sluimer - Judith Cosemans - Paola van der Meijden - Martijn Brouwers - Jordi Heijman	Flendrigzaal MUMC+
9.30-10.00	**Closed session** Research Council - Frits Prinzen, chair - Kristiaan Wouters - Erik Biessen - Matthijs Blankesteijn - Chris Reutelingsperger - Marjo Donners - Gerry Nicolaes	Flendrigzaal MUMC+
10.00-10.30	Coffee break	Flendrigzaal MUMC+
10.30-11.00	Meeting with the Head of the Heart+Vascular Center, Prof. Michael Jacobs	OBK A3-B3
11.00-12.30	Site visit: The Maastricht Study	
12.30-13.30	**Closed session** ERC (including lunch)	UNS 50 1.366
13.30-14.00	Meeting with the MUMC+ Board. Prof. Albert Scherpbier, Dean FHML	UNS 50 1.366
14.00-14.30	Meeting with the Executive Board	UNS 50 1.366
14.30-16.00	**Closed session** of External Review Committee. Discussion and formulation of preliminary conclusions	UNS 50 1.366
16.00-16.30	Presentation of preliminary conclusions of External Review Committee	Bonte Zaal