

### Personnel

Overview	Planned	Realisation in 2013-2015
Tenure track	6	6
Fellowships	6	3
PD positions (start-up)	6	4
PhD positions (start-up)	6	4
PD positions (project)	2 to 3 per year	8
PhD positions (project)	1 to 3 per year	9

### Finance

Under Gravitation, Delta ITP was awarded a total budget of M€ 11 for the first five-year period. The external money attracted by Delta ITP for its research programme for the 2013–2017 period amounted to a total of M€ 8.3.

The amounts spent of the Gravitation budget for the first three years are (in percentages):

Personnel	95%
Investments	104%
Other costs	63%
Total	90%

### SWOT

#### Strenghts

- Critical mass
- Quality of existing and new (tenure-track) faculty
- Proximity and coherence of the participating institutes

#### Opportunities

- Attract the highest quality permanent and temporary staff
- Establish Delta ITP as a worldwide leading theoretical physics center

#### Weaknesses

- Lack of gender diversity
- Challenge to attract the highest quality Delta ITP fellows
- Lack of internal and external visibility

#### Threats

- Maintain balanced and coherent Delta ITP

## 3.2.2 The committee's comments and criticisms

### Participating researchers

The committee is impressed with the way that the vacancies have been filled, which was well-considered with a very international result. Delta ITP searched diligently for six suitable PIs. These PIs can be viewed as the future leaders in their field. The committee is pleased about the fact that all young PIs have a tenure-track position, which will ensure that the institutes will absorb the lines of research after Gravitation funding has ended.

The fellowship programme for postdocs – the next generation of potential future leaders – is rarely being used. Delta ITP scouts domestically and abroad and compiles a shortlist, but it does not advertise these fellowships. The committee acknowledges the idea behind the shortlist but nevertheless believes that it should be possible for people to apply for these positions.

Despite the fact that the fellows are sufficiently supported by Delta ITP, a large number of them are being headhunted and leave. In such cases, the remaining budget is earmarked for hiring new talent. The committee appreciates the way in which Delta ITP handles the evolving dynamics of personnel.

Although Delta ITP is lagging behind in terms of spending the budget on researchers' salaries, the committee is confident that the recruitment round in September 2016 will set this straight.

As for the future, the committee is confident that the new generation of talented researchers will guarantee sufficient innovation.

#### Quality of the lines of research

Delta ITP is pursuing three lines of research, inspired by the three primary themes in the field. But by bringing together so many different lines of inquiry, these lines seem to be fading. The committee feels it is positive that Delta ITP researchers do not necessarily work on one line of research but use the entire breadth. The committee understands that in practice this leads to special new lines of research.

#### Institutional and organisational embedding

The organisational structure is light (appendix 5). Delta ITP has actively opted for a simple organisational structure in the hope that this will lead to higher quality science. The committee observes, however, that it is not always clear what the mutual responsibilities of the various bodies are and that there remains tension between the responsibilities of the consortium and the participating universities (heads of institutes and deans). The committee recommends that the mutual responsibilities of the various bodies be more precisely coordinated.

Delta ITP has come to the conclusion, based on the external review, that there is an urgent need to establish a scientific advisory board in order to validate progress and quality by approving the annual Delta ITP review and budget, a task that until now was carried out by the supervisory board. The committee is pleased that a female member of the educational committee was appointed to the executive board, which ensures that an early stage researcher has influence on the programme's content.

#### Cooperation

Although each institute has its own culture, the proximity of the three institutes to each other encourages cooperation. This collaboration already existed before the Gravitation project started. PhD projects are developed by researchers from different institutes. In practice, it seems that they often receive guidance from a single supervisor with only a relatively marginal contribution by the researcher from another institute. The committee believes that this is a missed opportunity, especially for theoretical physics. It recommends that the consortium therefore ensure that PhD students receive an equal degree of guidance from both supervisors, and that the activities take place in different groups/institutes.

At the national level, Delta ITP works together with colleagues from the universities in Groningen and Nijmegen, especially when it comes to training PhD students.

Currently, international cooperation consists primarily of the international recruitment of researchers, the fellowship programme and an extensive visitor's programme, in which leading world experts visit the consortium for a short or longer period of time. The committee suggests that Delta ITP also position itself for participation in European projects.

The committee is satisfied with Delta ITP's talent management, which consists of training the most talented students at the PhD and master's levels and which is embedded in the programme of the Dutch Research School of Theoretical Physics. It involves two courses a year. Moreover, the consortium has organised a series of workshops for the same target group with the industry advisory council, the aim of which is to acquaint students with a variety of organisations driven by analytics in the semi-private and private sectors in order to meet a diverse group of former physicists and learn how they developed their careers, and to expand their hands-on problem-solving skills while working in a team. At the same time,

the participating organisations from outside the university circuit are given an opportunity to meet students and examine several challenges in their organisation from the students' perspective. The PhD programme devotes extra attention to the code of conduct for academic research and the social aspects of academic research and the question of where a large number of PhD students will end up professionally.

#### *Anchoring*

The choices of themes and the strategically hired new researchers reflect Delta ITP's aim to secure and expand a tradition of long-term cooperation between the participating institutes. The committee believes that the Pls' tenure track positions guarantee absorption of the three institutes by the universities after 10 years. The consortium's critical mass, which has increased thanks to the Gravitation programme, and the international reputation that it has gained, means it is in a good position to become one of the most appealing locations in the world for research in theoretical physics, according to the committee. For that to happen, however, it will need long-term, stable funding, both at the programme and the individual levels.

#### *Realisation and budget*

The committee has observed that Delta ITP's expenses are according to budget.

#### *Knowledge utilisation*

The committee observes a hesitant start when it comes to looking for patentable ideas. There are more opportunities to share knowledge than are currently being used. The committee therefore recommends that this aspect be incorporated in, among other things, the curriculum for PhD students and postdocs. The committee believes that cooperation with experimental physics is already taking place but at an insufficient level. The committee believes this could be a task for an industry advisory council, which can provide input on how to pursue this aim. Cooperation could link two Gravitation projects (Delta ITP and NanoFront) to each other. In this context, the committee recommends that Delta ITP attempt to strengthen the industry advisory council, which currently consists of former physicists from the network of consortium members.

#### *SWOT*

The consortium's lack of visibility under the name Delta ITP is not a serious deficiency, according to the committee, as long as the participating institutes, who do enjoy individual recognition, profile and make themselves visible.

The synergy between the chosen research projects has resulted in a large degree of flexibility. Cooperation between the institutes has the effect of expanding people's outlook and inspiring them. The different institutes have been given roots, as it were, and now form one tree. Challenges for the longer term include anchoring, in which cooperation and critical mass can serve as an impetus for new recruits and the ability to respond to new developments.

#### *General conclusion*

Based on the available information, the committee recommends that Gravitation funding be prolonged for five years. However, it has several recommendations for Delta ITP.

### Recommendations

The committee recommends the following:

- coordinate mutual responsibilities of the various internal bodies more precisely
- establish a scientific advisory board
- in the future, attempt to strengthen the industry advisory council in the framework of the cooperation arrangement with experimental physics
- ensure that PhD students receive an equal degree of guidance from both supervisors
- seek cooperation in European projects

The committee recommends that Delta ITP report to the governing board of NWO after one year on the implementation of the recommendations from the committee. This should also be included as an important element in the final review.

## 3.4 CancerGenomics Netherlands (CGC.nl)

### 3.4.1 Introduction

CGC.nl is a consortium of research groups from the University Medical Centre Utrecht (applying organization), the Hubrecht Institute in Utrecht, Utrecht University, the Netherlands Cancer Institute in Amsterdam, the Erasmus Medical Centre in Rotterdam, the Academic Medical Center Amsterdam, Leiden University Medical Centre and Radboud University Medical Center Nijmegen.

### Mission

The mission of the CGC.nl consortium is to determine and understand genetic alterations in individual tumors in order to deliver precision medicine to individual cancer patients. Our ambition is to significantly improve life expectancy and quality of life for cancer patients and to provide multidisciplinary training for the next generation of cancer researchers and specialists.

### Original aims and goals

The original aims were:

- 1 To develop new three-dimensional (3D) tumor model systems and to validate their utility
- 2 To identify and understand the critical changes in tumors (driver mutations) and the causes of resistance by conducting functional screens
- 3 To identify and analyze (epi-)genetic alterations in cancers
- 4 To identify and analyze network perturbations in tumors and tumor-host interactions
- 5 To identify and analyze causes and consequences of genetic instability
- 6 To identify critical drug combinations for personalized cancer treatments

### Recruitment plan

See appendix 5.

### Recruitment

The budget included a PhD/postdoc student within the group of each of the 26 participants, and even though some people were hired with some delay, no problems were encountered in the recruitment of qualified personnel. In addition, the consortium hired staff to coordinate the establishment and distribution of the organoid biobank and sequencing efforts. This is largely according to the original plan.

### Finance

Under Gravitation, CGC.nl was awarded a total budget of M€ 18.5 for the first five-year period. The external money attracted by CGC.nl for its research programme for the 2013–2015 period amounted to a total of M€ 79. The amounts spent of the Gravitation budget for the first three years are (in percentages):

Personnel	86%
Investments	35%
Other costs	142%
Total	67%

### SWOT

#### Strengths

- Scientific excellence
- Strong collaborations between different institutes
- Development of new technologies, i.e. organoid technology, single cell analysis, imaging techniques
- Multidisciplinary research: Fundamental cancer research, clinical research and technology development is all represented by the CGC.nl PI's
- Outreach activities both for scientific (KIT meeting) as well as high school students (e.g. mobile DNA lab)

#### Weaknesses

- Gender imbalance at the PI-level
- Not all groups are equally connected to the consortium

#### Opportunities

- Bringing in more (female) junior groups into the consortium
- Possibility to participate in new initiative to strengthen fundamental cancer research and to improve translation and valorisation through OncoXL

#### Threats

- High drop-out rate of talented junior scientists due to uncertain future

### 3.4.2 The committee's comments and criticisms

#### Participating researchers

The committee is unable to get a clear picture, based on the budget accountability, of the precise specifications of the 26 research groups with one PhD student or postdoc.

It is striking that CGC.nl is not demonstrably on track to identify young top researchers. There are no tenure tracks in place and no investment at present in the extremely thin middle layer of top researchers under the age of 40. The consortium reports that it is identifying top researchers through its career guidance and in the participating institutes, but that this has not been arranged yet in the universities. The committee observes that the budgeting has been largely planned already and that this could compromise the flexibility to identify and deploy young PIs. It recommends creating some flexibility after all and also suggests laying the foundation for the next generation(s) of top researchers by means of start-up packages and tenure tracks for a limited number of very promising researchers.

#### Quality of the research programme

The chosen lines of research are strongly technology driven, and they seem to build on many years of existing infrastructure that were originally anchored in CBG and CGC. As a result, the consortium has lines of inquiry and proven lines of research that attract a great deal of funding. That makes it difficult to indicate what the added value of the Gravitation funding is, or which research results can be specifically ascribed to the Gravitation research programme.

Ultimately, the research programme does have a well-founded translational component focused on personalised medicine. A number of clinical trials were initiated based on patients' tumour material. All except one were sponsored by pharmaceutical companies, but if research topics do not interest the pharmaceutical industry, that is when the Gravitation budget can step in.

The consortium has such an outstanding plan focused on high-quality research that the committee believes it threatens the ability of the programme to adjust itself to new developments or lines of inquiry based on observations.

There is substantial interaction and coherence between the lines of research. The participating institutions have actively promoted the exchange of materials and methodologies. The distribution of knowledge about methods takes place in foundations, which serve as a model to promote exchange. The decision to opt for a foundation, as opposed to a private limited company (plc) was partly based on the fact this research programme deals with patients' material, thus ensuring ethical standards within the foundation.

According to the committee, the Gravitation programme is like a cement between the partners. It ensures critical mass, a technological push, the possibility of exchange and outreach, and it has a powerful translational component. The fact that the consortium is investing heavily in PhD students and material suggests to the committee that the consortium is particularly interested in implementing successfully established lines of research, rather than generating new ones.

#### 4.2.2 Organisation

The consortium's organisational structure is lean and mean (appendix 5). The committee notices that clinicians barely play a role in determining the direction of the research programme.

#### 4.2.3 Data management

There is no central data management. The consortium has indicated that it will follow the data policy plans of the guest institutes in order to improve data management. The committee does not feel that this is a good enough way of organising data management and recommends that this be done according to the FAIR principles (Findable, Accessible, Interoperable and Reusable). Quality assurance seems well organised. There is a scientific advisory board that convenes regularly and issues strict recommendations.

#### 4.2.4 Outreach

The consortium wants to expand its cooperation with clinical groups in the coming five years, and there are several international groups with which CGC.nl is communicating.

#### 4.2.5 Talent management

In terms of talent management, the infrastructure is continuing to build on existing research schools. The committee recommends that the consortium increase the number of meetings in order to promote interaction between the disciplines: instead of an annual meeting, at least one every three months. Also, the interaction should not be primarily a promotional endeavour, which is currently the case with the annual meeting where all groups report about the progress they have made.

#### 4.2.6 Future

The consortium has no major changes planned for the coming five years. The organisational embedding will not change, nor are any adjustments or reinforcements in sight. The consortium is working hard, however, to set up a new initiative with the Life Science & Health (LSH) top sector, Onco XL (working title), a Cancer top institute that aims to develop better applications and faster market introduction of medicines. Three ministries (Economic Affairs; Health, Welfare and Sport; and Education, Culture and



Science), the Dutch Cancer Society (KWF) and the LSH top sector have already pledged funds for this purpose.

#### Anchoring

The committee notices that the universities and institutes have not made any concrete commitments in terms of anchoring. The consortium believes it has opportunities for anchoring at Onco XL.

#### Realisation and budget

It seems that the definition of investment used by the consortium is different in the self-evaluation than it is in the budget it submitted. The committee notices that in the first three years, CGC.nl estimated higher costs for investments than for staffing expenses. Included in other expenses is a trial with medicines that the pharmaceutical industry can no longer profit from, which the committee evaluates positively. The committee has observed that CGC.nl is on track in terms of budget spending.

#### Knowledge utilisation

The committee is pleased about CGC.nl's extraordinary outreach programme, which is immensely popular. The consortium wants to strengthen the knowledge utilisation with up-and-coming world-class institute Onco XL. To promote the knowledge utilisation, the committee recommends that more clinicians become involved in the process that determines the direction of the research programme.

#### SWOT

The problem of gender balance at the PI level cannot be solved, according to the consortium, because there are not enough suitable candidates at the participating institutes in the age group below 40, and it is difficult to entice candidates from abroad because CGC.nl has little to offer them, other than a PhD position. The committee suggests that while this is a choice the consortium has to make, creating attractive positions for foreign top talents remains one of the options of Gravitation funding. The committee recommends putting gender balance permanently on the agenda in order to create more gender balance. Incidentally, gender diversity is not being assessed in the current evaluation.

Some groups have a stronger connection with CGC.nl than others. According to the consortium, it is currently difficult to make a selection because all groups were well connected when the budget was dispersed. The committee recommends that CGC.nl nevertheless evaluate this issue at this stage and, when possible, take appropriate measures.

The committee is concerned about the high dropout rates among talented junior researchers as a result of uncertain career prospects in a highly competitive environment with a strongly hierarchical character. It advises the consortium to take more responsibility for the career prospects of young talented researchers.

#### General conclusion

Based on the available information, the committee recommends that Gravitation funding be prolonged for five years. However, it has several recommendations for CGC.nl.

#### Recommendations

The committee recommends the following:

- create some budget flexibility to identify and deploy young PIs
- support and take more responsibility for the career prospects of young talented researchers
- increase the number of meetings and intensify them and make them more interactive
- involve more clinicians to determine the direction of the research programme
- identify at this early stage inappropriate or non-active groups and take appropriate measures within the possibilities permitted

In addition, the committee recommends the following regarding the optional topics (gender diversity, data management and ethics):

- put the problem of gender balance permanently on the agenda in order to create more gender balance
- organise data management according to the FAIR principle (Findable, Accessible, Interoperable and Reusable), at least regarding the framework conditions

The committee recommends that CGC.nl report to the governing board of NWO after one year on the implementation of the recommendations from the committee. This should also be included as an important element in the final review.

### 3.5 Frontiers of Nanoscience (NanoFront)

#### 3.5.1 Introduction

"Frontiers of Nanoscience" (NanoFront) is a joint endeavor of the researchers at the Kavli Institute of Nanoscience at Delft University of Technology and the nanoscientists working at the Leiden Institute of Physics at Leiden University.

#### Mission

NanoFront aims at pushing the frontiers in quantum nanoscience, bionanoscience, and nanotechnology. Research programme

The consortium identified three themes:

- 1 **Frontiers of quantum nanoscience – from quantum surprises to quantum devices:**  
Nanostructures open up new possibilities for exploring the nature, limits, and use of quantum mechanics. Nowadays, control of quantum objects such as qubits or nanowires is so extensive that their complexity can be increased for both the purpose of exploring and exploiting. We will explore the frontiers of the quantum world with exciting questions such as 'What is the nature of the exotic new Majorana fermions that we recently discovered?' or 'How large can an object be and still behave as a quantum object?' For exploitation, we will build circuits that entangle many degrees of freedom in a quantum superposition, and use this massive parallelism for computations that step towards realizing a quantum computer.
- 2 **Frontiers of bionanoscience – exploring and building life from the nanoscale up:**  
One of the most intriguing boundaries is that between the living and nonliving world. At the nanoscale, these worlds meet and can be studied quantitatively. We will explore key nanoscale components of the biological cell: the genome and its processing, proteins and their pathway to function, and the communication hub of molecular activity occurring at the cell membrane. Such nanoscale research is crucial to resolve the molecular origins of diseases. Following the lead of Feynman, who famously said "What I cannot create I do not understand," we also propose to build with biological material at the nanoscale by developing new biomolecules, sensors, networks, and functional cellular structures.
- 3 **Frontiers of nanotechnology – get real, go live:**  
Developing novel tools to image and control materials at the nanoscale is a key part of doing nanoscience, and it is our aim to push the frontiers of nanotechnology ahead. In particular, we choose to develop new 'nano-vision' tools focused on imaging under live conditions, from live imaging in biological cells to catalytic reactions under realistic conditions. We will also develop and exploit new nanodevices, from nanomechanical systems to atom-by-atom construction. While the focus of this theme is on the development of radically new tools, this research will also serve as a vibrant breeding ground for valorization.



### Members of the steering committee

See appendix 5.

### Personnel

Overview	Plan	Realisation in 2013-2016
PI (tenure track)	10	10
PD positions	10	7
PhD positions	90	66

### Finance

Under Gravitation, NanoFront was awarded a total budget of M€ 22 for the first five-year period. The external money attracted by NanoFront for its research programme for the 2013-2015 period amounted to a total of M€ 11.8. The amounts spent of the Gravitation budget for the first three years are (in percentages):

Personnel	81%
Investments	59%
Other costs	80%
Total	77%

### SWOT

#### Strengths

- The scientific quality of the NanoFront consortium is very high, as testified by papers, citations, impact, awards, and funding.
- NanoFront funding has made it possible to attract talented young researchers from top foreign institutes and to update the nano-infrastructure at Delft and Leiden, making it state-of-the-art throughout.
- The support for PhD students (from research to training and career preparation) is excellent, due to efforts by the Casimir Research School and NanoFront.
- The newly founded QuTech center has significantly expanded the impact and the international position of the NanoFront consortium.

#### Opportunities

- NanoFront stimulates novel interdisciplinary and inter-institutional research, much beyond common funding schemes, that creates opportunities to develop new synergetic research directions.
- The development of QuTech offers unique links with industrial partners operating in the field of quantum engineering.
- Through seed money and training in entrepreneurship exploitation of ideas and products generated by NanoFront research is being facilitated.
- New or refurbished housing is foreseen for all NanoFront groups, opening up new possibilities to interact with other disciplines and research companies.

#### Weaknesses

- As the constituents of the NanoFront consortium already have strong 'brand names' (Kavli, LION, Casimir), the NanoFront program has a relative low visibility.
- The younger faculty of the NanoFront scientific community is not represented in the Steering Committee and therefore only indirectly involved in strategy discussions.
- The profile of "Frontiers of Nanotechnology" is less pronounced than the other themes in NanoFront.
- NanoFront involves no less than 60 PI's and their many different PhD projects lead to a very wide spectrum of results.

#### Threats

- A large number of meetings and events are organized by LION, Quantum Nanoscience, Bionanoscience, Kavli, Casimir, as well as by NanoFront, risking an overflow.
- The freedom to create independent research lines by new PIs might lead to a program that lacks a clear overall focus.
- Success of individual research topics may lead to reduced commitment to the NanoFront program.
- There is a risk that the nanotechnology part of the NanoFront program will be undervalued compared to the quantum and bionanosciences, because it is judged on technological performance rather than on scientific impact.

### 3.5.2 The committee's comments and criticisms

#### Participating researchers

The committee observes that the 10 PIs were selected among the very best in the world. It is especially enthusiastic about the large number of PIs, the fact that they will receive a tenure track position if they succeed, and that each PI will receive a start-up package consisting of a PhD student and a postdoc, and €650,000 if they want to set up an experimental laboratory. This makes the consortium an attractive work environment despite the fact that the salary on offer is less than what competitors can provide, seeing as the consortium is bound to a university salary scale. As a result, there is a risk that top researchers leave for countries such as Germany and the United States. Nevertheless, thanks to the start-up packages that NanoFront can offer, and the excellent work environment, the consortium is still able to recruit top talents.

The committee is impressed how quickly the consortium got things up and running. As many as 66 of the intended 90 PhD posts have already been filled. There have been two PhD selection rounds. In one-third of the involved projects there was no interaction between the PIs and the various institutes and work areas of the consortium. However, two-third of the projects, involving a total of 43 positions, do concern projects with this kind of synergy. The committee would prefer to see more interaction with and supervision by more than one institute and work area.

Although it is not mandatory to provide information about gender diversity during the current evaluation, the researchers have verbally indicated that they are actively searching for female researchers to fill these positions and have indicated that their number is on the rise. Two of the ten PIs are women, which is a high percentage in physics. Delft is running a fellowship programme with ten positions for female researchers each year. There is also a new female department Chair.

The selection of 10 world class international PIs is one of this consortium's most important initiatives. The Gravitation funding has contributed to this consortium's strength by giving them the opportunity to hire the above-mentioned PIs and by attracting almost 100 PhD students (incl. co-funding) in order to also make it possible to identify subsequent talent.

#### Evolution of the research programme

When clear and profitable opportunities arise, NanoFront wants to expand the boundaries between the original objectives. The individual lines of research from the original project will remain the key focus. The second five-year term will continue along the lines of the first five without any major changes.

The selection of ten new PIs means that individual lines of research can become blurred or renewed, and the committee has already witnessed this because the consortium has landed ERC and similar grants. This confirms the notion that the consortium is an umbrella encompassing the nano-sciences, in which the focus is sufficiently flexible to enable young talent to excel.

#### Establishing an industry connection

NanoFront employs a light organisational superstructure, which uses the existing superstructure of the Casimir Research School (appendix 5). The committee suggest to establish an industry advisory board similar to that of the Delta ITP consortium. However, NanoFront disagrees in so far that individual PIs have their own discipline-specific network in the industry. As a prominent example QuTech was mentioned, an advanced research center of NanoFront-researchers with industry partners: TNO, Intel and Microsoft.

This kind of organ could advise the MT about opportunities in the business sector that have specific resonance in NanoFront's areas of interest. Therefore, the committee recommends that an industry advisory board be established to formalise contacts with the business sector.

NanoFront has an international advisory board that convenes regularly. Reports have been included in the self-evaluation.

### *Ethical aspects*

The work involves embryonic stem cells. Part of the consortium is planning to do work in synthetic biology in order to create living structures from cellular components. There are important ethical aspects connected to this work, not to mention important consequences on how the Dutch Social Support Act is implemented. However, ethical aspects are an optional aspect during this evaluation and have therefore not been assessed.

### *Cooperation*

Although it concerns an interdisciplinary research programme, it seems that the individual projects are not making optimal use of the opportunity to use the interdisciplinary input that is available in this consortium.

The committee observes that at the national level, only two universities – Delft and Leiden – are cooperating, and that the other Dutch groups in the area of nanotechnology are not systematically connected to this program.

The theory group in NanoFront collaborates with colleagues in the Delta ITP consortium. The PhD students of the consortia intermingle.

At the international level, NanoFront's PIs are considered leaders in their field. They are at the heart of the international scientific communities, with their own individual profiles. NanoFront's international reputation is being further reinforced by the highly international make-up of the NanoFront groups. They organise international symposia and workshops fairly frequently, which keep the scientific staff informed about the latest developments and provide an opportunity to network.

The fact that the Kavli Institute of Nanoscience Delft – the only Kavli Institute in Nanoscience outside of the United States – is also part of the consortium confirms, according to the committee, NanoFront's international presence.

### *Talent management*

The young talents receive good training through the Casimir Research School. This school offers PhD students and postdocs a set of discipline-related advanced-level courses. Moreover, PhD students are prepared for a career inside or outside academia. This research school also organises an annual international summer school for PhD students and postdocs, and there are career events, such as career discussion meetings and company visits.

### *Outlook*

The committee expects the ten PIs, who will receive tenured positions if they succeed, to become the backbone of future nanoscience. Absorption into the institutes by the universities has been pledged in writing. The PIs are the most important factor for anchoring and will give the nano-sciences in Delft and Leiden a massive boost. This could produce a new generation of candidates for the Talent Scheme.

### *Realisation and budget*

Essentially, € 40 million of the available € 50 million (Gravitation budget plus contributions from both universities) has already been allocated. The committee observes that as a result there is little flexibility to implement any major changes to the research programme with the remaining financial means. However, the consortium is fully convinced that this will not be necessary.

### *Knowledge utilisation*

The research is too fundamental for a high degree of knowledge utilisation, nor is this NanoFront's primary aim. Nonetheless, there is interaction with users of knowledge, in online courses (MOOC) and workshops, for example, to facilitate the transfer of knowledge between NanoFront and other research groups, video clips to promote the research, and factsheets that are published online and disseminated to network contacts in the business world.

#### SWOT

NanoFront considers the lack of an overall focus as a result of the PIs' freedom to pursue independent lines of research a threat. However, the committee also sees this freedom as a positive point, and recommends that the consortium start to promote interdisciplinary cooperation between the various groups of PIs.

#### General conclusion

Based on the available information, the committee recommends that Gravitation funding be prolonged for five years. However, it has several recommendations for NanoFront.

#### Recommendations

The committee recommends the following:

- establish an industry advisory board
- create the opportunity to fully tap into interdisciplinary cooperation

The committee recommends that NanoFront report to the governing board of NWO after one year on the implementation of the recommendations from the committee. This should also be included as an important element in the final review.

## 3.6 Research Center for Functional Molecular Systems (FMS)

### 3.6.1 Introduction

Three laboratories of the Radboud University Nijmegen, the Eindhoven University of Technology and the University of Groningen in the field of Supramolecular Chemistry have had a long-standing relationship in joint research and educational activities. This relationship has been transformed into a full partnership with a solid organizational structure, the Research Center for Functional Molecular Systems (FMS).

#### Mission

The ultimate goal of FMS is to design and synthesize chemical architectures with novel properties and functions emerging from the full control over the interactions of molecules in dynamic complex systems. With Nature as a source of inspiration, the overall program addresses the construction of functional life-like molecular systems, which is one of the grand challenges in the physical sciences.

#### Research programme

The science of FMS is organized around four main research programmes based on the combination of existing expertise of the participating groups:

- 1 Adaptive Nanosystems
- 2 Bio-inspired Molecular Systems
- 3 Nanoscopically Structured Functional Materials
- 4 Out-of-Equilibrium Systems

After the advice of the FMS scientific advisory panel the consortium has planned to rearrange the four programmes of the original plan by integrating programme no. 4 into programme nos. 1 and 2. Programme no. 3 is an evolution of the other three, and to establish a number of Focal projects that will have a more interdisciplinary and challenging nature and will be carried out jointly by postdocs located in the different universities/institutes.

### Personnel

The total funding for PhD students for the first 5 years has been used. The appointment of postdoc positions has been less than planned. The groups have been able to attract many postdocs who entered the program succeeding in obtaining their own personal money (e.g. Marie-Curie grants). Part of the budget allocated to postdocs has been used for PhD students after approval by the management team (MT). Technicians have been appointed in Nijmegen and Eindhoven. Although tenure track positions were present in the initial budget proposed in 2012, after finalizing the arrangement with NWO these positions were removed as a decrease in the final budget asked for choices. This choice was also based on the success of the "Sectorplan Physics & Chemistry" supporting a substantial number of young new staff in the FMS consortium, just before the Gravitation program started.

### Finance

Under Gravitation, FSM was awarded a total budget of M€ 16.5 for the first five-year period. FSM did not get any official co-funding. However, additional funding was provided by the universities before the start of the project and many FMS group leaders got additional funding the last years. The amounts spent of the Gravitation budget for the first three years are (in percentages):

Personnel	38%
Investments	122%
Other costs	39%
Total	47%

### SWOT

#### Strengths

- Excellent and outstanding science. Expressed by the SAP members as: *'The quality of the science is in general at a very high level: comparable to, or better than, the best that is being done internationally. This nascent Research Center is being watched closely internationally, and is - at least at the moment - the world's most innovative and scientifically adventurous.'*
- Highly motivated scientists who are aiming to explore original ideas within the area of functional molecular systems.
- Excellent international reputation and visibility of FMS; many publications in top Journals
- A very strong financial basis for long-term research due to a high success rate with (inter)national personal and research grants.
- The consortium is very focused on and imbedded in interdisciplinary institutes.
- A highly competitive group that is very balanced in age and gender.
- Many postdocs bring in their own funds.

#### Opportunities

- Reach out to international institutions to expand our collaborations with other disciplines.
- Industry begins to see the importance of the field of FMS.
- Complexity and out-of-equilibrium systems are becoming hot topics in science.
- The FMS topics are present in ~ 5 routes of the Dutch "Nationale Wetenschaps Agenda".

#### Weaknesses

- Groups are very strong by themselves and this initially temporized collaborative efforts.
- Interaction with other disciplines needs improvement, but required expertise is now clearer.
- Slow spending of funds.

#### Threats

- Continuous reduction of 1st stream money and NWO budget for long-term fundamental science.
- The FMS overall topic is not by itself a route in the "Nationale Wetenschaps Agenda".
- Further decline of the chemical industry in the Netherlands.

## 1.6.2 The committee's comments and criticisms

### Participating researchers

The committee observes that the Gravitation funds were equally distributed across the three participating institutes. Twenty-five PhD students were hired, each of which will be supervised by two PIs from the consortium. In addition, 9.2 FTE postdoc positions (11 postdoc years) were filled.

The committee also observes that this consortium did not opt for tenure track positions, contrary to its original application. The consortium's choice was partly based on the success of the Physics & Chemistry sector plan, in which a substantial number of new tenure trackers at the three institutes in question were able to start their work right before the Gravitation programme was launched. Although the participating institutes have not made any separate co-funding available for the Gravitation application, they did employ several people for tenure track positions and other appointments in the first three years to work on the consortium's themes.

The committee is impressed by the long list of (personal) awards and grants (from NWO, ERC and Spinoza laureates). This provides an excellent foundation for young talent, and the consortium appears to be paying particular attention to other ways of attracting and keeping young and mid-career talent. In the future, FMS will continue to pursue this approach, in which a number of focal projects will be added top-down in order to provide the postdocs with even more multidisciplinary and interdisciplinary cooperation. To support the three institutes in question, the consortium is making as much use of the universities' infrastructure as possible.

Although it is not mandatory to provide information about gender diversity during the current evaluation, the committee observes that the consortium has carried out a gender policy from the outset: 10 of the 38 Gravitation appointments are women (26%), while the average participation of women in the research groups is 17%. The ratio of male to female in the younger generation is almost 50/50. The committee is impressed with these figures.

### Quality of the research programme

The committee is also impressed with the progress in the development of partnerships between the three large groups of participants. The different lines of research got off to a flying start. The scientific advisory panel (SAP) recently made a number of suggestions to partly reorganise the original four programmes, which were taken over by FMS. In addition, attempts to join forces and work together with other disciplines, such as engineering and mathematics, were intensified. The committee subscribes to the SAP's argument that the interaction and coherence between the lines of research are even better guaranteed with the adjustments that have taken place within the consortium.

The committee considers the path that FMS has chosen for the coming five years an improvement. FMS will attempt to enhance cohesion even more within and between the research programmes, and the above-mentioned focal projects will lead to even more synergy and 'high risk, high gain' research.

Flexibility has largely been eliminated in the present university funding system (by reducing the first flow of funds and many fixed deliverables via the second flow of funds), which has restricted the freedom to carry out scientific research that responds to new developments and insights. Thanks to Gravitation funding it is possible to conduct innovative and unexpected research with a relatively high degree of risk that attempts to find 'the next level within functional molecular systems'. This concerned hired staff as well as investments and facilities that can be funded by the Gravitation programme and from which all of the involved research groups will benefit in their entirety.



Where possible, FMS will continue to approach the NanoFront Gravitation programme and, if relevant, seize the opportunity to work with other Gravitation programmes. The committee stresses the importance of potential cooperation between Gravitation programmes when possible.

#### *Institutional and organisational embedding*

##### *Organisational structure and management*

The organisational structure and management can be described as 'lean and mean'. The consortium has a clear and accessible organisational structure with low costs (see chart in appendix 5). It has not been changed since the consortium was established. The committee finds this a very fitting detail given that this lean and mean organisational structure was partly made possible by efficient local support from the three participating institutes and universities.

##### *Advisory/quality assuring body*

The committee is pleased to see that there is qualitatively good synergy between the SAP and FMS's management team (MT). The report has been included in the self-evaluation. The SAP's targeted suggestions are one of the factors that determine the future structure of the programmes, and the consortium seems to be very responsive to these recommendations.

##### *Cooperation*

The participating research groups are individually all extremely strong. The committee observes that this initially slowed down the concerted efforts, but that the MT has played an active role in encouraging cooperation from top-down between the three institutes. The committee greatly appreciates the progress that has been made in developing partnerships between the three large groups of participants.

At the national level, FMS works with colleagues from the universities in Delft, Eindhoven, Groningen and Nijmegen, especially in the area of training PhD students. This promotes integration between PhD students. The committee has assessed this cooperation as positive. The consortium actively seeks, independent of the problem at hand, to cooperate with others from adjoining disciplines. For example, FMS has worked with the NanoFront Gravitation programmes and the Netherlands Center for Multiscale Catalytic Energy Conversion.

The overall package that the FMS consortium can offer at the international level (an international make-up, organising international symposiums and workshops, and drawing international top researchers) ensures that international top talents see and continue to see the institutes as world-class institutes, according to the committee, and therefore also see the Netherlands as an extremely suitable place to conduct scientific research in a groundbreaking scientific environment. The consortium has therefore successfully positioned itself via the three institutes in question in the global job market. The committee observes that cooperation at the European level has been still somewhat neglected and should receive more attention in the coming years.

##### *Talent management*

The committee observes that young talents have been receiving valuable training at the local graduate schools. These offer master's students, PhD students and postdocs a set of discipline-related advanced-level courses and topical seminars. Moreover, PhD students are prepared for a career inside or outside of academia. The local graduate schools also organise an annual international winter school, which all young talents can join.

The self-evaluation report and the interview with the consortium has shown the committee that the MT (and thus the three institutes) has safeguarded the excellence of their researchers' groundbreaking scientific ideas in various ways, thus guiding today's talent to become the top researchers of the future. Particularly striking is that the researchers in the category 'under 40 years of age' have meanwhile obtained permanent positions. The MT ensures that these young and mid-career talents develop themselves at an appropriate pace.

#### Appraising

FMS's aim to give the participating institutes an impetus and expand has been effective, according to the committee, as a result of its thematic choices and newly hired researchers. The FMS consortium's critical mass, which has increased thanks to the Gravitation programme, and the international reputation that it has gained, means it is in an excellent position to become one of the most appealing locations in the world for research in functional molecular systems, according to the committee. Absorption of the three institutes by the universities is guaranteed after ten years. Prolongation of the university institutes has been pledged in writing.

#### Realisation and budget

The committee observes that FMS's expenses are in accordance with the budget, but that it is slightly lagging behind in terms of budgetary spending. The committee believes that this careful spending pattern is a sign of quality, because it reflects a selective recruitment policy of excellent researchers.

#### Knowledge and contacts

The committee has determined that FMS has effective contacts and cooperation with the industry. Developments in the consortium have led the institutes at the Eindhoven University of Technology and Radboud University Nijmegen to launch a number of start-ups. The business sector is now more aware of the importance of this field, in part thanks to the visibility of the Gravitation consortium and another area of focus, namely the 'next level in the area of functional molecular systems'. FMS's PIs are also involved in the recently founded Advanced Research Center Chemical Building Blocks Consortium (ARC CBBC), to which AkzoNobel, BASF, Shell, the Ministry of Economic Affairs, the Chemistry Top Sector, NWO and the universities in Utrecht, Eindhoven and Groningen have pledged a multi-year commitment. The committee does recommend that FMS establish an industry advisory board to formalise contacts in industry.

The committee also observes that the PIs have extensive experience with, and indeed focus on, patentable Intellectual Property (IP). The three university institutes have the right expertise and support to extend advice about patentable IP and patents.

#### AVOID

FMS mentions as a weakness the fact that it took a while for the consortium to start spending the Gravitation funds. The committee does not (necessarily) consider this a negative point because the consortium has been looking for excellent talent.

The committee is impressed with the consortium. The overall package that the FMS consortium can offer thanks to the Gravitation programme also ensures that international top talents see and continue to see the institutes as world-class institutes. As a result, the Netherlands remains an extremely suitable place to conduct scientific research in a groundbreaking scientific environment.

#### General conclusion

Based on the available information, the committee recommends that Gravitation funding be prolonged for five years. However, it has several recommendations for FMS.

### Recommendations

The committee recommends the following:

- **attempt to enhance cooperation in European projects**
- **establish an industry advisory board**

The committee recommends that FMS report to the governing board of NWO after one year on the implementation of the recommendations from the committee. This should also be included as an important element in the final review.

## Appendix 1: Terms of Reference mid-term evaluatie Zwaartekracht projecten call 2012

### Aanleiding voor opdrachtgever en onderwerp van de evaluatie

Het Zwaartekrachtprogramma heeft tot doel het identificeren en stimuleren van consortia met een excellent wetenschappelijk onderzoeksprogramma. OCW heeft in totaal M€ 50 per jaar beschikbaar gesteld voor een nieuwe selectie en stimulering van onderzoeksconsortia die de potentie hebben om tot de absolute wereldtop in hun onderzoeksveld te gaan behoren of zich reeds op dat niveau bevinden. Van de betrokken onderzoekers wordt verwacht dat ze nu op het hoogste nationale niveau opereren en reeds actief zijn op het hoogste mondiale niveau. Dit programma heeft eerder bestaan onder de naam Dieptestrategie.

De geselecteerde excellente consortia moeten leiden tot profilering van universitair toponderzoek en leveren daarmee ook bijdragen aan de topsectoren en de 'grand challenges' van het EU Kaderprogramma.

Aanleiding voor de evaluatie is dat de opdrachtgever (OCW) een tussenevaluatie wenst van alle Zwaartekrachtprojecten na 4 jaar om op basis daarvan te kunnen besluiten over voortzetting van de financiering voor een tweede termijn van 5 jaar.

### Doel, doelgroep en doel van de evaluatie

Op basis van deze evaluatie en het advies van het Algemeen Bestuur van NWO daarover neemt de minister van OCW een besluit over het al dan niet continueren van de financiering van de projecten voor een periode van wederom vijf jaar.

### Scope van de evaluatie, de methode en de periode

De evaluatie betreft de volgende zes gehonoreerde projecten uit de call van 2012:

Projectnummer	Hoofdaanvrager	Naam project	Startjaar
024.001.027	Prof. dr. E.P. Verlinde (UvA)	"Delta-Institute for Theoretical Physics: Matter at all Scales"	1-5-2013
024.001.031	Prof. dr. C. Dekker (TUD)	"Frontiers of Nanoscience (NanoFront)"	1-1-2013
024.001.035	Prof. dr. E.W. Meijer (TU/e)	"Research Centre for Functional Molecular Systems"	1-2-2013
024.001.006	Prof. dr. P. Hagoort (RUN)	"Language in Interaction"	1-7-2013
024.001.003	Prof. dr. C. Kemner (UU)	"Individual development: Why some children thrive, and others don't."	1-5-2013
024.001.028	Prof. dr. R. Bernards (UMCU)	"Cancer Genomics Centre Netherlands (CGC.nl)"	1-1-2013

In 2016-2017 zullen de projecten uit de call van 2013 worden geëvalueerd middels hetzelfde protocol.

#### 4 Hoofdvraag van de evaluatie

Tijdens de midterm evaluatie wordt de kwaliteit van de uitwerking van het ingediende onderzoeksprogramma getoetst. Zijn de projecten goed uit de startblokken en op stoom gekomen? Wordt aan de randvoorwaarden voldaan om deze projecten tot een succes te brengen?

Indien de tussentijdse evaluatie in lijn met de verwachtingen ligt, wordt een tweede termijn van 5 jaar toegekend.

#### 5 Basis voor beoordeling

De kern van de evaluatie is een vergelijking van de onderzoeksplannen met de uitvoering tot nu toe en een vooruitblik. We hebben daarbij het beoordelingskader van het programma Zwaartekracht vertaald naar evaluatievragen voor zover deze van belang is bij het beantwoorden van de hoofdvraag van deze midterm evaluatie (zie het format in de bijlage).

De evaluatiecriteria zijn deze:

- 1 Deelnemende onderzoekers
  - Invulling vacatures
  - Toekomst
- 2 Kwaliteit uitvoering onderzoeksprogramma
  - Uitvoering onderzoekslijnen
  - Interactie en coherentie tussen de onderzoekslijnen
  - Toekomst
- 3 Institutionele en organisatorische inbedding
  - Organisatiestructuur en management
  - Voortgangs- en kwaliteitsbewaking
  - Adviserend/kwaliteitsbewakend gremium
  - Inbedding en samenwerking
  - Talentmanagement
  - Toekomst
  - Verankering
  - SWOT-analyse
- 4 Realisatie en begroting
  - Personeel
  - Investeringskosten
  - Overige kosten
  - Co-funding
- 5 Kennisbenutting
  - Interactie met kennisgebruikers

De consortia worden in dit stadium niet beoordeeld op de output. Ook co-funding wordt buiten beschouwing gelaten bij de beoordeling, conform de NWO kaders herziene begroting 2012. Het is echter wel een belangrijk beleidsaspect waarover zowel OCW als NWO graag informatie willen ontvangen. De gegevens verschaffen een beeld van de verschillen in mogelijkheden tot co-financiering tussen de consortia.

Vragen over genderdiversiteit, datamanagement en ethiek (aspecten die in de call 2012 nog niet, maar in die van 2013 wel zijn meegenomen in het beoordelingskader) zijn voor deze projecten facultatief en zullen eveneens buiten beschouwing worden gelaten bij de beoordeling.

## 5 Uitvoering: evaluatiecommissies en secretariaat

De evaluatie zal worden uitgevoerd in twee stappen:

- De consortia voeren eerst een zelfevaluatie uit met behulp van een evaluatieformulier.
- Deze zelfevaluaties tezamen worden vervolgens beoordeeld door een overkoepelende onafhankelijke, externe, nationale evaluatiecommissie, die op verzoek van de staatssecretaris van OCW wordt ingesteld door NWO. De evaluatiecommissie wordt samengesteld uit onafhankelijke leden (wellicht reeds gepensioneerd) die goed weten wat het besturen van dergelijke grote consortia inhoudt, en die goed zicht hebben op het Nederlandse wetenschapsbestel. De commissie wordt ondersteund door één of twee NWO-secretarissen.

### of externe commissie

- Is in staat het management van het onderzoek adequaat te beoordelen.
- Is in staat te reflecteren op het talentbeleid van de consortia.
- Is nationaal samengesteld.
- Heeft kennis van en ervaring met het Nederlandse onderzoekstelsel, inclusief de onderzoeksgeldstromen.
- Is onafhankelijk en neemt vertrouwelijkheid in acht.

## Onderzoeks methoden: hoe en waar data worden verzameld

We streven naar een lichte maar degelijke tussenevaluatie. De consortia stellen eerst op basis van het bijgevoegde formulier met evaluatievragen een beknopt zelfevaluatie-rapport (max. 15 pagina's A4) op. Men dient aan te geven hoe men de ontwikkeling ziet ten opzichte van de oorspronkelijke plannen. Hoe is het onderzoeksprogramma uitgevoerd? Zijn er aanpassingen geweest en waarom? Wat waren de consequenties? Hoe verloopt de samenwerking? Ook dient men te kijken naar het toekomstperspectief en concrete mogelijkheden tot verankering na afloop van de Zwaartekrachtfinanciering. Een en ander wordt geïllustreerd door:

- Organogram
- Gezamenlijke activiteiten
- Samenstelling van het adviserende/kwaliteitsbewakende gremium inclusief recente notulen
- Financiële stand van zaken (realisatie personeel, investeringskosten, co-financiering en overige kosten, begroting komende jaren)
- SWOT-analyse m.b.t. de institutionele en organisatorische inbedding van het consortium
- Bijlage: Gezamenlijke key publications
- Bijlage: Kopie datacontract repository indien relevant
- Bijlage: alle output vanaf een jaar na de toekenning van de Zwaartekrachtfinanciering

De overkoepelende evaluatiecommissie vormt zich een oordeel op basis van de zelfevaluaties en een evaluatiebijeenkomst, waar de consortia een presentatie geven en waar de commissie gesprekken voert met maximaal vier personen per consortium, waaronder in elk geval de wetenschappelijk directeur en managing director. De commissie krijgt ook de beschikking over de oorspronkelijke onderzoeksplannen van de consortia.

Het commissieoordeel wordt verwoord in een Engelstaalig evaluatierapport.



## 8 Timing (wanneer?), planning van de uitvoering en budget

Uiterlijk begin 2017 neemt OCW een besluit over voortzetting van de financiering van de projecten. NWO streeft ernaar om OCW in oktober 2016 van een advies te hebben voorzien.<sup>3</sup>

Het tijdpad ziet er als volgt uit:

### 2015

- |           |  |
|-----------|--|
| Maart-mei | - Overleg NWO intern en extern (consortia, OCW) over de Terms of Reference (ToR) |
| Mei-juni  | - ToR gereed (24 juni: ToR wordt voorgelegd aan het Algemeen Bestuur)            |
| September | - Samenstelling evaluatiecommissie   |

### 2016

- |                    |   |
|--------------------|---|
| Januari-maart      | - Zelfevaluatie door de projecten   |
| Maart-april        | - Indienen zelfevaluatiedocument door projecten   |
| Mei-juni           | - Evaluatiebijeenkomst: evaluatiecommissie spreekt met projectleiders en managing directors van de projecten, en presentatie door consortia |
| Juni-oktober       | - Opstellen evaluatierapport  |
| Oktober            | - Besluit Algemeen Bestuur NWO  |
|                    | - Advies NWO aan OCW  |
| Uiterlijk november | - Besluit OCW over voortzetting financiering  |

Bij het opstellen van de planning is rekening gehouden met een feitelijke financiering tot en met 2017, zodat projecten in het geval van een negatief besluit over voortzetting voldoende tijd krijgen om af te bouwen.

Voor de midterm evaluatie van de call van 2013 geldt hetzelfde tijdpad, dat start in de zomer van 2016 met het toesturen van de ToR aan de consortia.

Het evaluatiebudget is maximaal k€40 per jaar. Er moet onder meer rekening worden gehouden met de volgende kostenposten:

- Reis- en verblijfkosten commissieleden
- Onkostenvergoeding commissieleden
- Kosten evaluatiebijeenkomst
- Bureaukosten (0,4 fte)

## 9 Opbrengsten en publicatierechten

De opbrengst van de evaluatie heeft de vorm van een evaluatierapport van de externe evaluatiecommissie. De publicatierechten hiervan liggen bij NWO.

<sup>3</sup> De projecten hebben al financiering ontvangen tot 1-1-2018, waardoor in geval van een negatief advies geen sprake is van abrupte beëindiging.

## Appendix 2: Template midterm self-evaluation Gravitation projects call 2012

*For this self-evaluation form part of the assessment framework for the Gravitation programme has been translated into evaluation criteria, aimed at the realisation of the research programme and the institutional and organisational embedding of the consortia. The focus of the self-evaluation is a comparison of the research plan with the research realised up until now and a look to the future. We advise you to make use of 'critical friends' during this self-evaluation.*

*The completed form contains a maximum of 15 pages, supplemented with annexes. You can also include URLs to refer to relevant additional information.*

Application number: 024.001.....

Project title: .....

Brief introduction to the consortium

*Participating consortium*

### **Filling of vacancies**

Did the filling of vacancies proceed according to plan? Which changes took place compared to the original plan? What were the reasons for this? What are the consequences of the changes?  
Optional: How do you deal with gender diversity (opportunities for women)?

### **Future**

Which changes (outlines) do you anticipate over the next five years with respect to the personnel appointed within the consortium? Which adjustments/reinforcements are needed to achieve the objectives?

*Gravitation programme*

### **Realisation lines of research**

Describe the start and the progress of the separate lines of research based on the objectives. Have changes taken place with respect to the original plan? What were the reasons for this? What are the consequences of the changes? Where does the Gravitation funding make the difference?

How do you promote the interaction and coherency between the lines of research? Which changes have been made with respect to the original plan for this interaction/coherency? What were the reasons for this? What are the consequences of the changes? In the annex include a list of any joint publications that emphasise this interaction.

What is the planning for the next five years with respect to the realisation of the research programme? Which adjustments/reinforcements are still needed to achieve the objectives?

Describe the organisation structure. Have changes taken place with respect to the original plan? What were the reasons for this? What are the consequences of the changes?

### **Progress and quality assurance**

How is the safeguarding of quality and progress arranged?

*Optional:* State how you deal with data management (state how you will store research data and render this findable and suitable for re-use; if relevant, add a copy of the repository data contract.

*Optional:* State how you deal with the ethical aspects of the research (for example the Personal Data Protection Act (WBG), the Medical Research Involving Human Subjects Act (WMO), the Netherlands Code of Conduct for Scientific Practice and the Code of Conduct for the Processing of Personal Data, and any discipline-specific guidelines).

### **Advisory/quality assurance body**

Does the consortium have a quality assurance body (e.g. Scientific Advisory Board)? If it does then who are its members? Have meetings/consultations already taken place? In the annex add recent notes of meetings of the quality assurance body, if applicable.

#### **Advisory/quality assurance body**

Name	Position

### **Embedding and collaboration**

How is the embedding and collaboration currently organised in the national and international contexts? Support your argument with a summary of activities from which this embedding and collaboration is apparent.

### **Talent management**

How to you realise talent management (e.g. activities and training courses for the next generation of researchers)? Have changes taken place with respect to the original plan? What were the reasons for this? What are the consequences of the changes? Support your argument with a summary of relevant activities.

What are the plans for the next five years with respect to institutional and organisational embedding? Which adjustments/reinforcements are still needed to achieve the objectives?

How will the consortium be anchored after the end of the Gravitation funding and how is that being worked towards? Describe this in as much detail as possible.

What are the strengths and weaknesses of the organisation and the management of the consortium and what are the opportunities and threats present in the environment?

### Threats

The tables match those on the application form.

Complete the table (up to and including 2015: realised; from 2016 onwards: budgeted).





## 5 Knowledge utilisation

### *Interaction with knowledge users*

How do you involve knowledge users in the research? How do knowledge users benefit from the research of the consortium/ how do you expect they will benefit? Add any examples you may have.

### Annex

Joint key publications	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

## Appendix 3: CV Members of the Committee for the Midterm Evaluation of the Gravitation projects 2012

### Prof. emeritus S.W.J. (Steven) Lamberts (chairman)

Prof. S.W.J. Lamberts is emeritus professor of internal medicine, former rector of Erasmus University Rotterdam and member of the supervisory board of the Academic Medical Center in Amsterdam. Furthermore, he was chairman of the Royal Netherlands Academy of Arts and Sciences' 'depth strategy' (2011) evaluation committee, the precursor of the Gravitation programme, and chairman of the supervisory board of the Netherlands Genomics Initiative.

### Prof. U. (Ute) Bültmann

Prof. U. Bültmann is professor of work and health, in particular from a lifecourse epidemiological perspective. Her research focuses on the areas of public health and occupational health. Furthermore, she is adjunct scientist at the Institute for Work & Health, Toronto, Canada, guest researcher at the Karolinska Institute, Stockholm, Sweden and visiting professor at the National Research Centre for the Working Environment, Copenhagen, Denmark. She has experience managing scientific consortia and experience with multidisciplinary and interdisciplinary research in the medical and social sciences.

### Prof. C.D. (Christine) Dijkstra

Prof. C.D. Dijkstra is professor of molecular cell biology and immunology, and head of the same department at the VU University Medical Center in Amsterdam, and is co-founder of the VUmc MS Center in Amsterdam. She was a member of the Committee of Experts for advice on the spending of funds from the Economic Structure Enhancement Fund, and a board member of the Rathenau Institute.

### N.C.M. (Niels) Laane

N.C.M. Laane has a doctorate in biochemistry. He was professor of biochemistry in Wageningen, director of the Netherlands Genomics Initiative (NGI), a consortium of 20 public-private partnerships in the field of genomics, and interim director of the Life Science & Health Plaza of the Life Sciences & Health top sector in the Netherlands. Furthermore, he has been a member of various national and international committees involved in policy development, industrial biotechnology, the life sciences, and the funding and coaching of start-ups.

### Prof. D. (Dirk) van der Marel

Prof. D. van der Marel is professor of physics, initially at the University of Groningen and from 2003 onwards at the Condensed Matter Physics department at the University of Geneva. His research interests encompass optical spectroscopy and the electronic properties of strongly correlated electron systems. Furthermore, he was visiting scientist at the Max Planck Institute in Stuttgart and at Stanford University. He was a member of the Gravitation selection committee for the 2012 call.

Prof. F. Zwarts is emeritus professor of Dutch linguistics at the University of Groningen, former rector of this university, and former board member of the University Campus Fryslân in Leeuwarden. Furthermore, he was scientific director of the Behavioural and Cognitive Neuroscience Research School and a member of the 2013-2014 NWO Roadmap committee.

### NWO secretaries

N.L.C. (Natalie) Stevens

M. (Merlijn) Jaspers

## Appendix 4: Programme evaluation meeting Gravitation projects call 2012

Dates: 5 June, 6 June and 10 June 2016

Location: Grand Hotel Karel V, Geertebolwerk 1, Utrecht

### Programme\*

#### Day 0: Sunday 5 June

16:00 – 16:30	Welcome by Marianne de Visser, member of NWO Governing Board (Lodewijk Napoleon kamer)
16:30 – 18:30	Introduction of committee members and preparation of meeting
18:30 – 19:00	Pre-dinner drink
19:00	Dinner

#### Day 1: Monday 6 June

9:15- 9:45	Short briefing (Graaf van Egmond Zaal)
9:45 – 11:45	<b>Delta-Institute for Theoretical Physics: Matters at all-scales</b>
9:45 – 10:00	preliminary meeting (committee only)
10:00 – 10:30	presentation consortium
10:30 – 11:30	interview with consortium delegation
11:30 – 11:45	debriefing (committee only)
11:45 – 13:00	Lunch
13:00 – 15:00	<b>Language in Interaction</b>
13:00 – 13:15	preliminary meeting (committee only)
13:15 – 13:45	presentation consortium
13:45 – 14:45	interview with consortium delegation
14:45 – 15:00	debriefing (committee only)
15:00 – 15:15	Break
15:15 – 17:15	<b>Frontiers of Nanoscience (NanoFront)</b>
15:15 – 15:30	preliminary meeting (committee only)
15:30 – 16:00	presentation consortium
16:00 – 17:00	interview with consortium delegation
17:00 – 17:15	debriefing (committee only)
17:15 - 17:45	Evaluation of the day

## Day 2: Friday 10 June

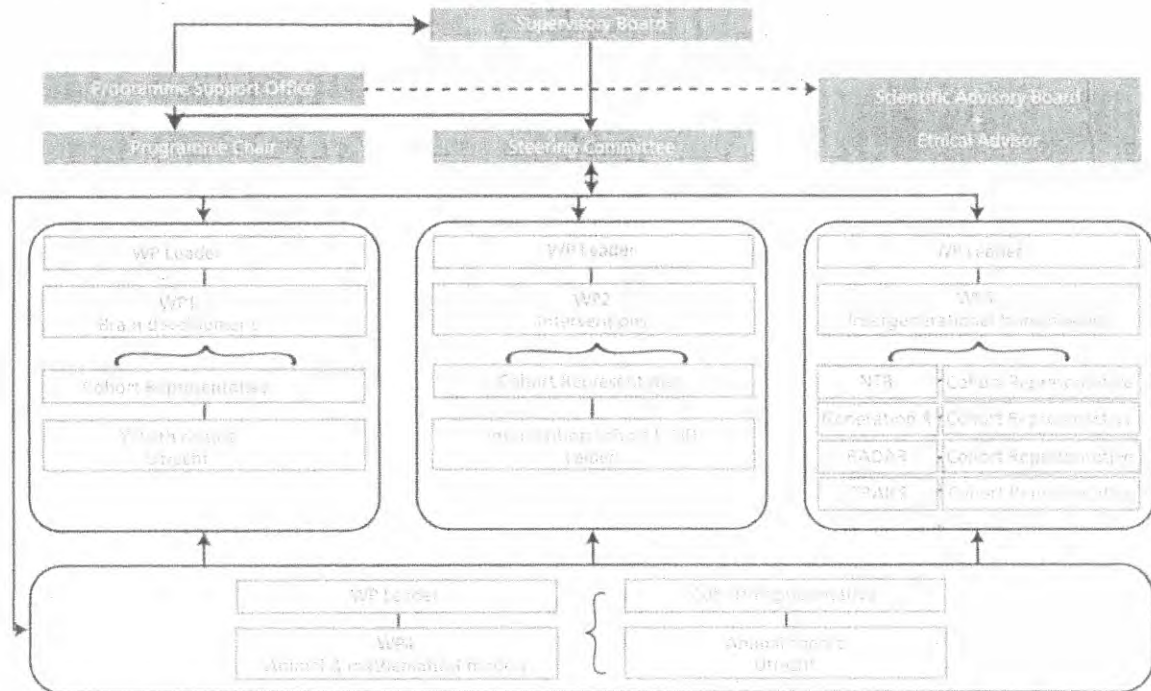
9:15- 9:45	Short briefing (Graaf van Egmond Zaal)
9:45 – 11:45	<b>Cancer Genomics Centre Netherlands (CGC.nl)</b>
9:45 – 10:00	preliminary meeting (committee only)
10:00 – 10:30	presentation consortium
10:30 – 11:30	interview with consortium delegation
11:30 – 11:45	debriefing (committee only)
11:45 – 13:00	Lunch
13:00 – 15:00	Research Centre for Functional Molecular Systems
13:00 – 13:15	preliminary meeting (committee only)
13:15 – 13:45	presentation consortium
13:45 – 14:45	interview with consortium delegation
14:45 – 15:00	debriefing (committee only)
15:00 – 15:15	Break
15:15 – 17:15	<b>Individual development: Why some children thrive, and others don't</b>
15:15 – 15:30	preliminary meeting (committee only)
15:30 – 16:00	presentation consortium
16:00 – 17:00	interview with consortium delegation
17:00 – 17:15	debriefing (committee only)
17:15 –	Evaluation of the day, closing and farewell of the committee

\* De voertaal tijdens de evaluatiebijeenkomst is in principe Nederlands. Mocht een wetenschappelijk directeur of managing director van een consortium het Nederlands niet beheersen dan kan (een gedeelte van) de bijeenkomst ook in het Engels plaatsvinden.

## Appendix 5: Organograms, research leaders and members scientific advisory board

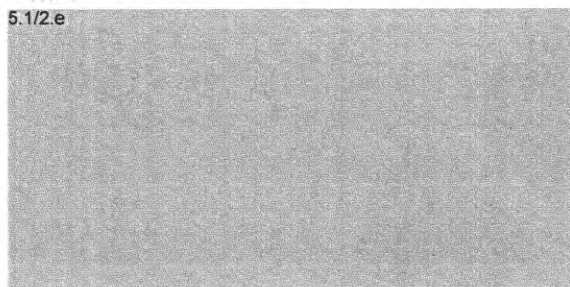
Consortium Individual development (CID): Why some children thrive, and others do not

Organogram

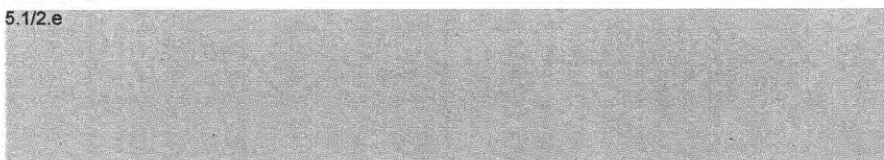


Research leaders

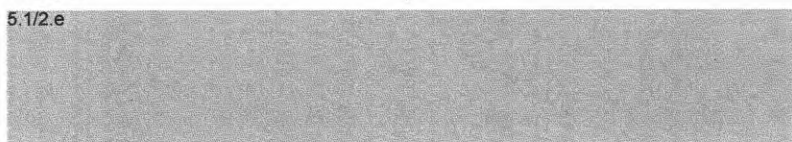
WP 1  
5.1/2.e



WP 2  
5.1/2.e



WP 3  
5.1/2.e



5.1/2.e [redacted] (cohort representative NTR)

5.1/2.e [redacted]

WP 4

5.1/2.e [redacted] (WP leader and animal cohort representative)

5.1/2.e [redacted]

5.1/2.e [redacted]

#### Scientific advisory board

5.1/2.e [redacted]

5.1/2.e [redacted] 5.1/2.e [redacted]

[redacted]

5.1/2.e [redacted]

5.1/2.e [redacted]

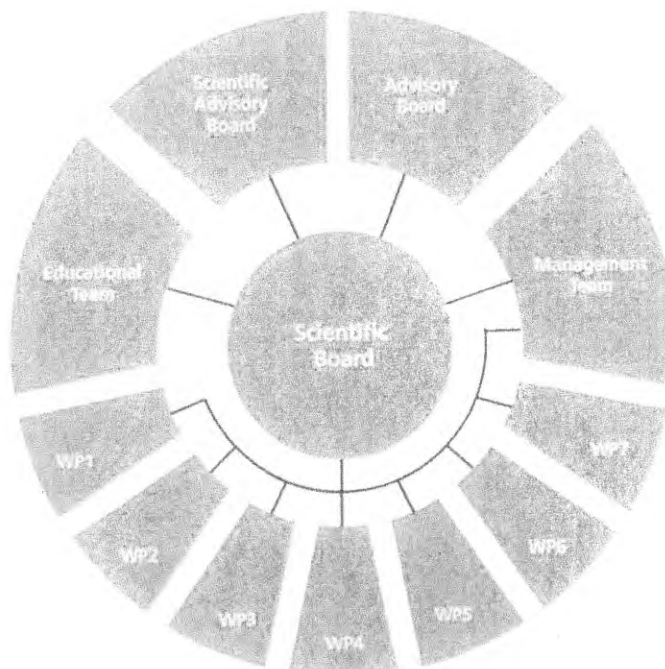
5.1/2.e [redacted]

5.1/2.e [redacted]

5.1/2.e [redacted]

#### Language in Interaction Consortium (LII)

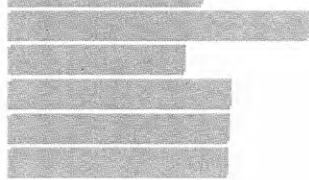
Organization





## Research leaders

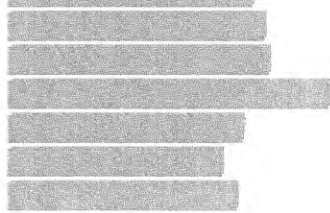
5.1/2.e



Radboud University Nijmegen  
University of Amsterdam  
Max Planck Institute for Psycholinguistics, Nijmegen  
Donders Centre for Neuroscience, Nijmegen  
Radboud University Nijmegen  
Radboud University Nijmegen, Donders Centre for Cognition

## Scientific advisory board

5.1/2.e

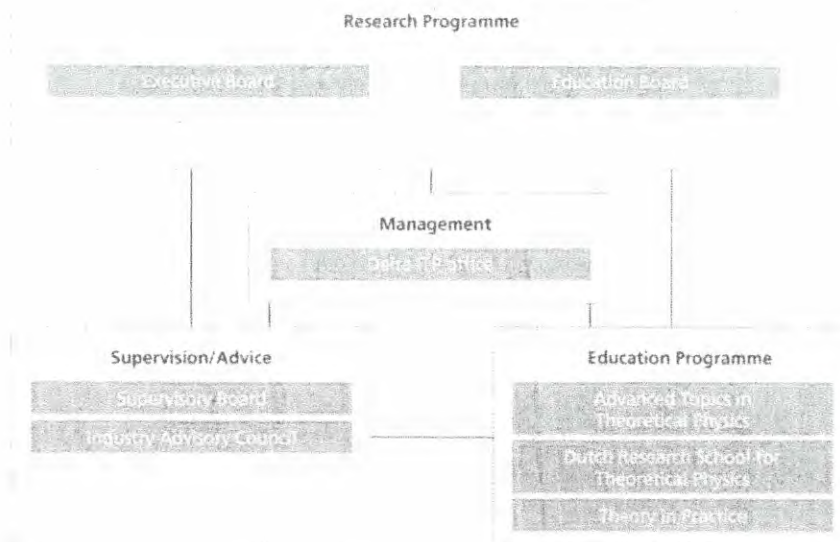


Prof.dr. Núria Sebastián Gallés

San Diego State University, USA  
Lund University, Sweden  
Yale School of Medicine, USA  
University of Amsterdam, The Netherlands  
Tufts University, USA  
Carnegie Mellon University, USA  
New York University, USA & Max Planck Institute of Empirical  
Aesthetics, Germany  
Universitat Pompeu Fabra, Spain

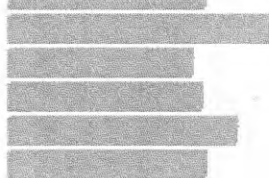
## Delta-Institute for Theoretical Physics (Delta ITP)

## Organization



## Research leaders

5.1/2.e



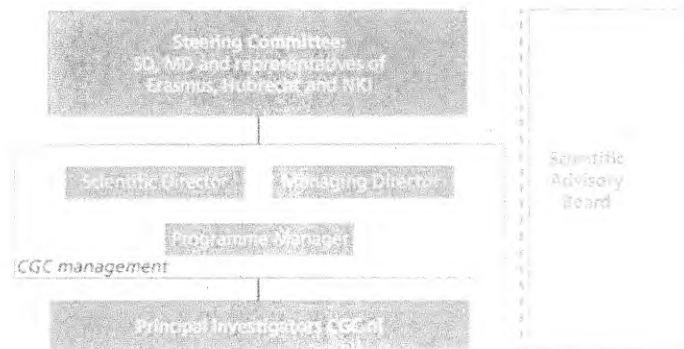
Universiteit van Amsterdam  
Universiteit Leiden  
Universiteit van Amsterdam  
Universiteit Utrecht  
Universiteit Utrecht  
Universiteit Leiden

## Scientific advisory board

Not yet installed

## Genomics Netherlands (CGC.nl)

## Allotment



## Research Leaders

5.1/2.e	NKI
	UMC Utrecht
	NKI
	UMC Utrecht
	Hubrecht Institute
	UMC Utrecht
	Radboud UMC
	Universiteit Utrecht
	NKI
	Erasmus MC
	Hubrecht Institute
	Hubrecht Institute
	Erasmus MC
	AMC
	NKI
	NKI
	NKI
	Erasmus MC
5.1/2.e	LUMC
	NKI
	Hubrecht Institute
	Hubrecht Institute
	Radboud UMC
	Erasmus MC
	NKI
	NKI

## Scientific advisory board

5.1.2e

5.1/2.e

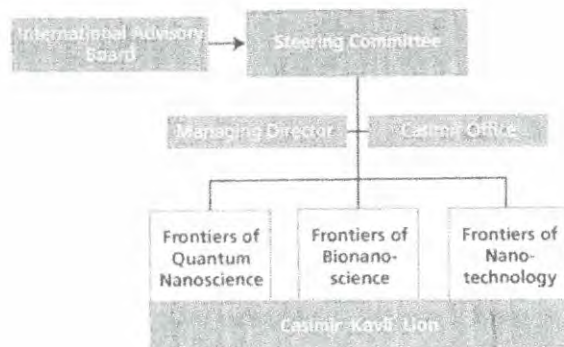
5.1/2.e

5.1/2.e

5.1/2.e

## Frontiers of Nanoscience (NanoFront)

## Organogram



## Members of the steering committee

5.1.2e

5.1/2.e

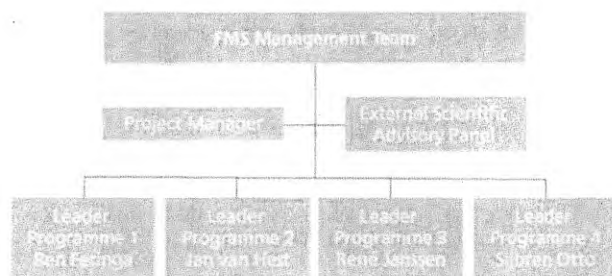
## International advisory committee

5.1.2e

5.1/2.e

## Research Center for Functional Molecular Systems (FMS)

### Organogram



### Research leaders

5.1.2e

University of Groningen  
 Radboud University Nijmegen and Eindhoven University  
 of Technology  
 Eindhoven University of Technology;  
 Eindhoven University of Technology  
 Radboud University Nijmegen  
 University of Groningen

### External advisory panel

5.1.2e

Harvard University (Cambridge, USA)  
 Max Planck Institute for Polymer Research (Mainz, Germany)  
 University of Cambridge (Cambridge, UK)  
 University of Twente (Enschede, The Netherlands)  
 ETH Zürich (Zurich, Switzerland)  
 Harvard University (Cambridge, USA)

Netherlands Organisation for  
Scientific Research (NWO)  
Department for policy development

Postal address  
PO Box 93138  
2509 AC The Hague  
The Netherlands

Visitors address  
Laan van Nieuw Oost-Indië 300  
The Hague

[www.nwo.nl](http://www.nwo.nl)



Netherlands Organisation for Scientific Research

**TER VOORBEREIDING**

Aan: OWB

**Onderzoek en  
Wetenschapsbeleid****Van**

5.1.2e

T +31 6 5.1.2e

**Datum**

06 februari 2018

**Referentie****Bijlagen****Kopie voor****Reeds afgestemd met****Aantal pagina's**

2

**nota**

Geannoteerde agenda: Overleg quantum

Paraaf OWB

Datum

**Doel**

Woensdag 14 februari vindt er een overleg plaats met 5.1.2e (EZK) en 5.1.2e (EZK/QuTech). Hieronder is een geannoteerde agenda.

**Toelichting****1. Europe (flagship)**

Toelichting van QuTech/EZK over de stand van zaken (call, governance) en de rol die EZK en OCW kunnen spelen, met name voor de positionering van Nederlanders in de Strategic Advisory Board (SAB). Zij zullen vragen of OCW kan bijdragen bij deze lobby.

Advies: OCW houdt zich doorgaans hier niet mee bezig (hooguit bij infrastructuur), echter als er wens is vanuit het veld en het van groot wetenschappelijk belang is zijn er mogelijkheden. Advies: Vragen wat ze verwachten van OCW en wat het effect van een Nederlander in de SAB zou zijn.

**2. Quantum campus**

Toelichting door QuTech/EZK op stand van zaken. Dit onderwerp gaat over de transitie van kennisinstituut naar ecosysteem/campus. Hier wilt QuTech steun voor vanuit EZK en OCW. Quantum is één van de topsectoren en financiering daarvan loopt deels via NWO. Zodoende draagt OCW indirect bij aan Quantum. Het is een interessante ontwikkeling die verder toegelicht zal worden tijdens de bijeenkomst.

Advies: Vragen wat ze verwachten van OCW met betrekking tot de Quantum campus.

**3. Nationale Wetenschapsagenda**

EZK zal de stand van zaken van de NWA willen weten en hoe quantum ook aanspraak kan maken op middelen van de NWA.

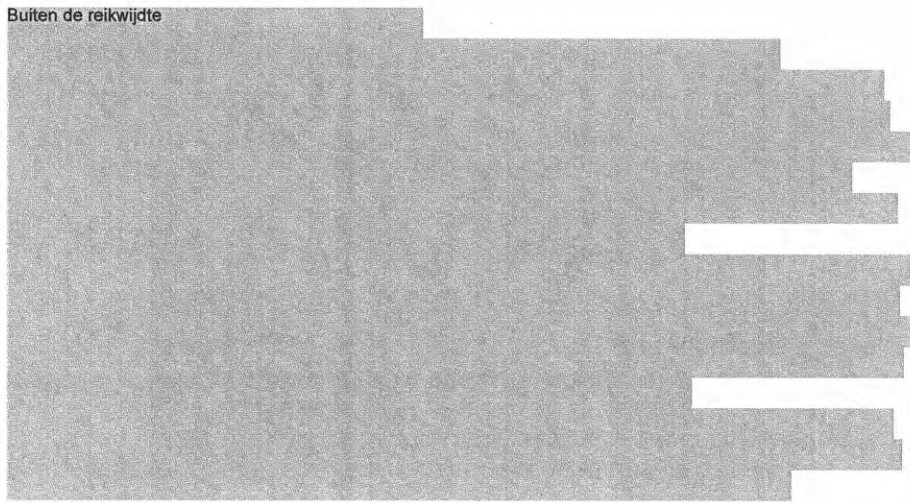
Advies: stand van zaken rondom NWA uitleggen. Specifiek ingaan op feit dat de onderzoeken zullen worden gefinancierd en niet de routes als zodanig.

**Datum**  
06 februari 2018

4. Stuurgroep Q-campus 12 april, inkomend bezoek Brussel

De stuurgroep vergadert op 12 april en op dezelfde dag is er ook een bezoek uit Brussel van een high level working unit op dit terrein. Het doel van dit bezoek is om de delegatie inzicht te geven over de readiness van TU Delft en regio Zuid Holland voor KP9. Dit gaat naast quantum ook over green village, Yes! Delft en VPDelta. Leden van DG CNECT en RTD worden uitgenodigd. Momenteel is de gastenlijst niet bekend. EZK zal dit verder mondeling toelichten.

Buiten de reikwijdte







**TER BESLUITVORMING**

Aan: MOCW

Onderzoek en  
Wetenschapsbeleid

Van

5.1.2e

T +31 6 5.1.2e

**Datum**

01 maart 2018

**Referentie**

**Bijlagen**

2

**Kopie voor**

**Reeds afgestemd met**

**Aantal pagina's**

2

# nota

Werkbezoek 12 april TU Delft

Paraaf OWB

Datum

## Aanleiding

Op 12 april gaat u op werkbezoek bij TU Delft waar een high level delegatie aanwezig is, waaronder Eurocommissaris Moedas. U zult een kort gesprek voeren over de bijdragen van de TU Delft aan onderzoek, innovatie en onderwijs; en de rol van Europese programma's, H2020 en de opvolging KP9. Aansluitend is er een rondleiding door de DREAMHALL met pitches van studenten en starters, gevolgd door een introductie over QuTech en een korte lab tour.

## Kernpunten

- Het grootste deel van het werkbezoek zal besteed worden aan quantum. TU Delft heeft aangegeven dat het doel van het werkbezoek is om QuTech beter Europees te positioneren.
- TU Delft heeft een aantal onderwerp aangegeven die mogelijk ter sprake komen bij de policy meeting (10 min): KP9 en robotica initiatieven.
- Elk onderwerp zal kort worden toegelicht evenals mogelijke andere besprekpunten.
- U zal worden ondersteunt door 5.1.2e (5.1.2e OWB) en 5.1.2e (OWB).

## Spreekpunten

### *Policy meeting*

TU Delft heeft aangegeven de volgende punten mogelijk aan Moedas en u voor te leggen:

- het zich snel ontwikkelende onderzoeksthema van human control over AI en robotics (multidisciplinair);
- noodzaak om een mission op AI en robotics te starten in de EU, om fragmentatie tegen te gaan en focus aan te brengen in de ambities (ook in relatie tot US en China/Azië);



- belang van AI en robotics onderzoek voor de concurrentiekracht van NL zowel wetenschappelijk als industrieel en maatschappelijk;
- de kracht en impact van innovatie door robotica en AI via initiatieven van nationale en Europese allure zoals bijvoorbeeld Robo Valley en Robo House;
- de vraag om geschoolde en goed opgeleide roboticists, de loopbaanperspectieven, op verschillende opleidingsniveaus

**Datum**  
01 maart 2018

U kunt aangeven dat:

- U multidisciplinariteit op het onderzoeksthema robotica toejuicht.
- U kunt vragen hoe zo een missie er uit zo moeten zien en wat de ambities zijn op dit onderwerp.
- U kunt vragen hoe er met andere universiteiten op dit onderwerp wordt samengewerkt.
- U kunt vragen in hoeverre Robo Valley samenwerkt met het Flagship initiatief dat op robotica loopt.
- U kunt aangeven dat het Techniekpact zorgt voor aansluiting van het onderwijs op de arbeidsmarkt in de technieksector.

*KP9*

- U kunt aan Moedas vragen of er onverwachte wijzigingen of grote veranderingen zijn opgetreden in het KP9 voorstel, bijvoorbeeld onder invloed van Franse lobby op het JEDI initiatief (zie 'Achtergrond')?
- *[Passief]* Indien Moedas over de adviesvraag van de Oostenrijkse minister Fassman begint:
  - U kunt aangeven dat er begrip is voor het Oostenrijkse verzoek. Nederland heeft het verzoek dan ook zorgvuldig overwogen.
  - Ook al kan Nederland niet instemmen met het voorgestelde 'fast track' voorstel, NL is welwillend om te praten over een aantal thema's en hoofdlijnen, mits mogelijk zonder dat er al een akkoord is op het MFK en Brexit.
  - U kunt Moedas vragen welke thema's dit zouden zijn.

*Quantum*

- U kunt vragen aan TU Delft hoe actief ze hebben mee gedaan met de call die is open gesteld tijdens de preparation ramp-up fase voor de FET Flagship.
- Quantum is één van de 25 routes van de Nationale Wetenschapsagenda.



Minister Van Engelshoven

Directie Communicatie

Contactpersoon

5.1.2e

06- 5.1.2e

Edoc:

maandag 21 november 2022

memo

**Bezoek D-Dream Hall + QuTech**  
**Kort overleg met VCRM TUD & Moedas**  
**Donderdag 12 april, Delft**

<u>Exacte datum, locatie en tijden van het optreden</u>	
Tijdstip ontvangst	14.30 uur
Tijdstip optreden	14.30 uur
Tijdstip vertrek	15.30 uur
Locatiennaam	TU Delft, meer precies de D:DREAMHALL, zie <a href="https://www.tudelft.nl/d-dream/">https://www.tudelft.nl/d-dream/</a>
Adres	Stevinweg 4
Postcode en plaats	2628 CN Delft
Telefoonnummer	015- 5.1.2e ( 5.1.2e ) / b.g.g. 06- 5.1.2e (contactpersoon bezoek)
Naam/nummer zaal	D:Dreamhall, entree
Routebeschrijving / parkeren	Parkeren voor de deur 14.30 uur bij de D-Dream Hall (Stevinweg 4 te Delft). Na afloop van het bezoek aan de D-Dream Hall zal MOCW na het bezoek aan TN/QuTech (gebouw 22/Lorentzweg 1 – uitgang TN/Noord tussen de Aula en TN) door haar chauffeur weer worden opgehaald. De TU Delft zal de chauffeur begeleiden.
Ambtelijke begeleiding	Protocol: 5.1.2e
<u>Contactpersoon voor het optreden/bezoek</u>	
Naam	5.1.2e / 5.1.2e
Functie	5.1.2e TU Delft
Telefoon (mobiel)	06- 5.1.2e / 06- 5.1.2e
E-mail	5.1.2e @tudelft.nl 5.1.2e @tudelft.nl
<u>Informatie voor de bewindspersoon</u>	
U wordt ontvangen door	5.1.2e , 5.1.2e / 5.1.2e TU Delft, u ontmoet dan ook gelijk Carlos Moedas, Commissaris voor RTD, alsmede bovengenoemde 2 contactpersonen
Waar wordt u ontvangen?	In de entree hal van de D:Dreamhall, Stevinweg 4 Delft
Wat wordt er van u verwacht	Bij de entree wordt u naar een zaaltje geleid voor het voeren