

## Responses to PRC recommendations from the SEP evaluation Nov 2023

On behalf of the Faculty board and management of the participating research institutes (ENTEG, ESRIG, GBB, GELIFES, Stratingh, VSI and ZIAM) we express our gratitude to the chair and members of the international peer review committee for their time and effort they put into the thorough assessment of our research at seven of the faculty's ten research institutes, the graduate school GSSE, and FSE as a whole. We are thankful for the constructive dialogues with staff, students and management and for the valuable feedback which we will take forward into our next strategic period.

Below the reader can find the responses to the recommendations the committee presented in their report.

### FSE Response to SEP recommendations

#### Recommendations for Board of the University

##### Central Facilities, buildings

- Foster greater awareness among central UG support services about the unique requirements of individual institutes, improve access to AFAS administration software and enhance responsiveness of Human Resources.
- Reconsider the division of tasks at the UG and FSE levels to a revised organisational support structure that is best for all.
- Realise state-of-the-art buildings for all institutes. Develop incentives to economise on space.

##### Knowledge Transfer

- Modify and align spin-off ownership conditions with those of other universities. Drop the rules: 1) imposing a maximum share of ownership while being a (full-time) staff member, and 2) imposing a reduction of UG-employment for staff members involved in spin-off companies.

##### Cross-faculty collaboration

- Start a UG seed funding scheme for collaborative projects between FSE and the Faculty of Medical Sciences that helps PIs acquire subsequent joint research grants

**Reaction FSE:** the faculty board recognizes these points raised by the committee. We will discuss them at an upcoming administrative meeting with the University Board. Many aspects are already being discussed between the relevant central and FSE departments (for instance related to HR, AFAS, buildings and space) and we look forward to continuing these discussions and implementing actions for improving support at the faculty.

#### Recommendations to the Board of FSE

##### FSE strategy, collaboration

- Maintain a strong multidisciplinary research strategy, stimulating inter-institute collaboration.
- Expand the general faculty themes with a theme on sustainability (energy transition, materials scarcity, sustainable chemistry)
- Develop a future vision for FSE (and UG) operating as part of a knowledge and innovation ecosystem network of the future ('University 4.0').

**Reaction FSE:** To build a strong faculty-wide research strategy and strengthen collaboration, four faculty-wide working groups were installed and tasked with proposing a concrete, coherent plan for ambitious, new research, education and impact activities within the faculty towards four major societal challenges: energy, sustainability, digitalisation, and health. These four themes will link well with ongoing research and education activities in the faculty as well as within the university, for instance with the four university schools. They also serve as an important link with the innovative ecosystem in the northern region, so that we can also position ourselves optimally to form collaborations with other institutions and the business community, and strengthen funding opportunities. Developments include our contribution to Nij Begun (ereschuldmiddellen), working together with local industry, such as our new EngD programmes with the Innovation cluster Drachten, and building up larger scale collaborative "knowledge and innovation ecosystems" such as HyBrit (Hybrid research group Biopolymer and Recycling Innovations), the Center for Autonomous systems, and the Future proof computing campus (with CogniGron), together with local and national partners.

#### Funding streams, overhead and institutes

- Assign a dedicated mission budget to each institute with which the institute can make autonomous choices in hiring of e.g., support personnel, financing contract extensions.
- Reduce the number of PhD candidates with foreign fellowships and compensate this by a stronger focus on (collaborative) national and European grants.

**Reaction FSE:** the faculty board appreciates the input from the committee. During a recent round of administrative meetings with the management of the institutes, the board discussed the creation of a mission budget (for institutes that do not yet have such a budget). The idea of a mission budget is generally very positive, but at the moment there is consideration for the difficult financial situation of the faculty which makes creating such a budget for now challenging.

At the faculty we are investigating ways to stimulate applying for more collaborative national and EU grants to reduce the intake of foreign PhD students. Some examples include double doctorate programmes with strategic EU partners and funding the 4<sup>th</sup> year of Doctoral network grants (with financial support from the University Executive Board). We already see a lower dependence on CSC fellowships, creating a more balanced diversity in our PhD student population.

#### Career development, new staff

- Develop clear metrics for different kinds of recognition and rewards within the new recognition and reward policies.
- Develop a firm action plan, together with the GSSE and the institutes, to reduce the duration of the PhD trajectories; develop an incentive scheme that rewards the institutes that are successful at this.
- Develop and support FSE-wide postdoc community building activities and postdoc-targeted support and mentoring.
- Take measures to increase the proportion of Dutch students and PhD candidates.

- Develop an action plan for career development of technical support personnel.
- Do not further expand the number of PIs.

**Reaction FSE:** The new Career in Science and Engineering policy implemented at our Faculty was inspired by the rewards and recognition movement, which is reflected in the three different career focus areas in CPSE, teaching, research and impact focus. The set of criteria for each promotion phase are clearly outlined in the new policy, which have attention for career ambitions, flexibility and workload balance. We have not focused on using quantitative metrics for purposes of promotion, but rather focus on discipline-specific progress in assessing career milestones, one way of doing this is by including a discipline-specific expert in the BC1 evaluation committee.

Reducing PhD duration: See also the response from GSSE. At FSE we are actively working towards reducing PhD completion times. All research institutes have submitted their plans for reducing these times and the Faculty Board together with the Director of the GSSE will follow developments.

Develop an action plan for career development of technical support staff: We are looking into a career development plan for support staff within the context of the FSE Safe and Pleasant programme and recognition and rewards. We also have a retraining programme in place, initiated by the current financial situation, where OBP staff are provided with courses if they have interest in a new function within the faculty or university.

Finally, on expanding activities targeted at postdocs, at the moment such activities are limited due to the faculty's current financial situation. For postdocs, FSE has a postdoc counselor and Postdoc ambassadors who are the point of contact for postdocs in the faculty. The Faculty also has an active postdoc council that provides input to the faculty board. Regarding the recommendation to limit the expansion of PIs, the current financial situation forces us to look critically at our staff numbers. For the moment we are not looking to expand our number of staff except in exceptional circumstances where expertise in a particular area is needed for upholding our excellent education and research programmes.

#### Communications

- Make the UG/FSE website more flexible, while stimulating personal websites for PIs and institutes.

**Reaction FSE:** Certainly there are possibilities for staff to create their own website, which can be linked to link to the official *MePA* on the RUG website. The structure of the FSE website is provided by the UG website, and we adhere to these structures.

#### Societal impact, knowledge transfer

- Train PIs in the well-established Impact plan methodology, challenging researchers to describe their research vision in terms of a chain from output to outcome to impact.
- Develop quantitative metrics for assessing the impact that is achieved with the research and challenge each institute to provide quantitative estimates where possible.
- Organise regular (voluntary) trainings for entrepreneurship featuring role models from FSE startups.

**Reaction FSE:** The Faculty Board appreciates these suggestions. Several research institutes have implemented an impact plan strategy where (new) staff members write-up their impact plan for their research programme, which is then discussed annually at R&D meetings. We expect all

institutes will implement the impact plan strategy, also seeing the importance of having an impact plan for external funding applications.

Currently the RUG is developing a research information dashboard (FRIDa), where FSE is a major stakeholder. The goal is that the dashboard will provide quantitative metrics information based on the research strategy of the institute/faculty. All institutes have provided their input on what should be included in the dashboard, and we will continue to be involved in the dashboards developments. At FSE we have recently appointed a faculty-level Data Analytics team, who will have research data analytics in their portfolio, and will connect with the Research Intelligence team at R&I and the UB.

At FSE we are also pursuing other routes to increase our impact, including (1) **dual appointments** of experts from industry as academic staff at our research institutes who contribute to research and education, and (2) the formation of **hybrid research groups** in collaboration with other knowledge institutions and industry (for example HyBRit team from Katja Loos and Vincent Voet NHL Stenden) (see also our response to FSE Strategy and collaboration above).

#### Academic culture

- Promote a more balanced gender distribution among PIs in institutes where gender disparity exists. Actively support institutes that lag behind in their diversity efforts and stimulate the sharing of best practices between institutes.
- Appoint a trusted advisor at every institute, where that is not already the case.
- Conduct regular employee surveys (medewerkerstevredenheidsonderzoek) to evaluate the efficiency of policies and identify further improvements.
- Share and implement best practices from institutes within the faculty aimed at improving the gender balance, with a specific focus on raising awareness about biases, attracting, and retaining female candidates, implementing family friendly work practices, and fostering a secure and inclusive work environment.

**Reaction FSE:** These points have our full attention. We will discuss the topics regarding gender balance and sharing best practices at upcoming monthly Directors Meetings. We are currently exploring the best approach to establish structures that provide all staff with access to a trusted advisor. Finally, we will continue to conduct regular employee surveys as per UG policy.

Included below are the individual reactions from:

- The Graduate School Science and Engineering (GSSE)
- Engineering and Technology Institute Groningen (ENTEG)
- Energy and Sustainability Institute Groningen (ESRIG)
- Groningen Biomolecular Sciences and Biotechnology Institute (GBB)
- Groningen Institute for Evolutionary Life Sciences (GELIFES)
- Stratingh Institute for Chemistry
- Van Swinderen Institute for Particle Physics and Gravity (VSI)
- Zernike Institute for Advanced Materials (ZIAM)

## GSSE Response to the PRC Recommendations

- The committee recommends that the GSSE improves the feedback and quality monitoring system for GSSE courses, involving the PhD council.

**Response GSSE:** Some PhD Academy courses are organized by the GSSE, while others are managed by various UG departments, including the Groningen Graduate Schools, the Language Centre, and HR experts. Courses organized by the GSSE undergo annual evaluations. In the fall of 2024, we will review the evaluation forms and procedures. Additionally, we will explore a method to ensure that course evaluations from other departments are received. The outcomes of these evaluations will be discussed annually with the PhD Sounding Board, a group of PhD students representing the different research institutes within FSE. Some members of the PhD Council, a committee of PhD students representing their peer group, are included in the Sounding Board. This way, the PhD Council can keep a finger on the pulse of GSSE developments.

- The committee recommends that the GSSE assists the Faculty Board in creating measures to reduce the duration of PhD projects at all institutes.

**Response GSSE:** In the fall of 2023, the GSSE advised the Faculty Board to address the issue of extended PhD durations and recommended several measures at the research institute, GSSE, and Faculty levels (memo *Finishing in Four vs Fifty in Five*). These measures have been discussed with the directors and PhD coordinators of the research institutes. Some measures have already been implemented as follows:

*By the Faculty:*

- A bonus/malus system based on PhD duration has been incorporated into the faculty financial allocation model to research institutes
- Recruitment training has been made mandatory for PhD supervisors
- The policy that PhD students without a defense date cannot be appointed as (pre-) postdocs is being enforced

*By the GSSE:*

- Organization of a series of annual information and self-help sessions for PhD candidates throughout their PhD journey; this is to assist PhD candidates in their planning and empower them to take control of their PhD research trajectories
- Implementation of stricter standards for English proficiency (recognized language certificate with a required minimum score is obligatory)
- Additional thesis-defense time slots have been scheduled in the fall months

Currently, the GSSE is in the process of implementing the following measures together with the Research Institutes:

- Each Research Institute has formulated minimum requirements for PhD theses.
- Each Research Institute has established a PhD monitoring committee and system.
- A policy allowing PhD students without a contract or defense date to use UG facilities for up to 3 months is being introduced.

- The committee recommends that the GSSE establishes a regular information exchange between GSSE, institute PhD coordinators, and PIs, where the GSSE regularly provides data on PhD candidate wellbeing and provides advice to the PIs on how to deal with this.

**Response GSSE:** We are certainly in agreement with this recommendation, as we already have a bi-annual PhD Wellbeing Survey. The results of this survey are discussed with supervisors, PhD support staff, and PhD candidates themselves.

- The committee recommends that the GSSE helps to resolve (unconscious) biases in the judgment of the quality of PhD projects by the PIs that lead to lower fraction of *cum laude* rates for female PhD candidates.

**Response GSSE:** In recent years, the GSSE has informed PhD supervisors and faculty management about bias in the evaluation of PhD theses by female candidates. We will put forward a new procedure for proposing the *cum laude* distinction to the Dean of Graduate Studies, which includes specific thesis assessment criteria. We have often observed that assessment committee members from outside our own university are unsure of what our *cum laude* convention is. Besides informing members of PhD assessment committees about the existence of the gender bias in thesis assessment, we will also generally encourage them to propose PhD candidates for the *cum laude* distinction based on fulfillment of the assessment criteria mentioned above.

- The committee recommends that the GSSE leaves the development of new programmes, new scholarship opportunities, and strengthening partnerships with other universities as goals of the institutes.

**Response GSSE:** We believe the GSSE is well poised to play a strong role as a facilitator of new and existing recruitment initiatives and partnerships with other universities, as we know and understand our most important stakeholders - PhD candidates, supervisors, and research institutes - extremely well. With ample experience in the procedures and issues that exist in PhD studies at the UG, we have the innate understanding required to effectively interact with science and engineering graduate schools at other faculties nationally and internationally. Working in close collaboration with the Faculty Board's internationalization officer, we can support efforts to increase the number of scholarship applications, provide better financial support for PhD candidates and supervisors, and help achieve the Faculty Board's strategic goals with respect to PhD candidate recruitment. We acknowledge the potential conflict of interest between dependence on external funding and the quality of PhD candidates admitted to our programme.

However, as Graduate School, we have always prioritized the recruitment of strong candidates above securing funding, as recent initiatives like implementation of stricter language requirements for admission have shown.

The GSSE will not participate in the recruitment of individual PhD candidates, but provides support and guidance to PhD candidates and their supervisors regarding scholarship applications. This ensures efficient organization of registration and enrollment processes, including the negotiation of Double Doctorate contracts. This latter is an excellent example of where our comprehensive knowledge of PhD regulations allows us to effectively liaise with partner universities during this process.

## ENTEG Response to the PRC Recommendations

- Collaboration between ENTEG and Humanities & Social Sciences

**Response ENTEG:** The committee suggested exploring opportunities for collaboration between ENTEG and the broader discipline of humanities and social sciences in other faculties at UG, in areas such as human perception in robotics, and consumer behavior in energy transitions. We acknowledge the significance of interdisciplinary collaboration and recognize that it can provide us with a competitive advantage compared to other engineering research groups in the Netherlands. As the only Dutch engineering institute embedded within a comprehensive university, we have exploited this unique position in the profiling of our engineering activities for the past years. Several ENTEG research groups have participated in a number of research projects/programmes together with researchers from the aforementioned faculties that is however not explicitly described in our SEP report and discussed in detail during the SEP site visit. For instance, together with the psychology department, our researchers in smart energy systems have conducted research on optimal energy market mechanisms that include potential behavioral changes of consumers towards prosumers due to the growth of household renewable energy production. As another example, our PIs have also worked together with social scientists to understand the opinion and social network dynamics that can be used in the control of (mobile) robot networks. In the Ocean Grazer project, our PI's collaborate with researchers from the Faculty of Law and the Faculty of Spatial Sciences to study legal framework, spatial planning, and technological deployment of offshore energy production and storage systems.

Based on these ongoing collaborations and the recommendation of the committee, we will formulate strategies that will stimulate such interdisciplinary collaborations further. One of the short-term strategies is to leverage the four interdisciplinary schools established within the university that serve as platforms for interdisciplinary initiatives and networking between different faculties. The interdisciplinary collaboration is encouraged through a PhD scholarship programme which facilitates and stimulates setting up connections with colleagues from other faculties. Our institute is already well-positioned within the Jantina Tammes School (Digital Society, Technology, and AI) and the Ockels School (Energy and Climate), and we are actively working on establishing similar connections with the other two schools. As a recent example of our commitment to interdisciplinary collaboration, two of our staff members have taken on key roles within the schools as coordinators. Additionally, we plan to increase awareness of interdisciplinary opportunities internally through targeted communication channels, such as the ENTEG newsletter or intranet updates.

- Utilizing NWO and EU funding systems including ERC

**Response ENTEG:** As detailed in our SEP report, ENTEG has more research projects with regional funding than some other institutes within the faculty. Through this strategy, ENTEG has had a direct impact on the region and it is expected to remain the strength of the institute in the coming period due to the urgent economic and industrial needs of the region. In addition to its regional focus, ENTEG acknowledges the importance of aligning its regional collaborations with opportunities for NWO and EU funding. Strong regional partnerships can serve as a foundation for multidisciplinary consortia, which are often valued in such funding programs.

We realize that this strategy may introduce an imbalance between applied and fundamental engineering science research outcomes. To achieve a more balanced portfolio between applied and fundamental engineering science research projects, the institute will develop a strategy to increase

the proportion of NWO and EU research projects. This strategy will ensure that while ENTEG continues to address urgent regional needs through applied research, it also strengthens its contribution to fundamental engineering science by actively pursuing prestigious national and international grants.

In the period after the SEP site visit, the ENTEG office has been strengthened with the addition of a funding officer and with the creation of the ENTEG Development Fund (EDF); both of which are set up to expand the proposal writing capacity of the institute and to strategically invest in setting up of NWO and EU consortia projects and ERC grants. The main aims of EDF are to promote collaborations within ENTEG, stimulate collaborations with other researchers in the Netherlands and Europe from academia and industry, improve the visibility of engineering at the RUG, increase the number of PhD graduations, and remain an attractive institute for our staff. PIs can receive financial contributions for writing support for NWO/EU grants, increasing their and ENTEG's external visibility (e.g. publishing in high-impact open-access journals, participating in outreach activities, attending to EU meetings, etc), and support to cover the 4th year of PhD salaries in EU projects. The latter addresses a common hurdle for our PIs, who often lack the funds to pay a full-year salary for EU-funded PhDs. By increasing the visibility of our PIs and fostering networking opportunities, we aim to enhance their competitiveness in acquiring NWO and EU grants, which often require strong, established networks and impactful academic profiles.

To strengthen collaborations with industrial and societal partners, PIs need visibility to potential collaborators and a strong (inter)national network. This is particularly challenging for new international staff who need to establish connections and understand Dutch working practices. We will continue to encourage our PIs to participate in networking activities organized by the faculty or schools. We have also initiated such activities within the institute, e.g., by organizing visits to companies with groups of PIs and inviting companies to visit us. These activities are funded by the previously mentioned ENTEG Development Fund, and we aim to continue this initiative.

Through these combined efforts, ENTEG aspires to maintain a balanced portfolio that addresses both regional and international priorities, fostering impactful collaborations and advancing both fundamental and applied engineering science.

- Balanced distribution of nationalities and industrial partnerships

**Response ENTEG:** The committee's feedback to create a better-balanced distribution of nationalities in our PhD research staff and reduce dependency on scholarship grants is acknowledged. Historically, we have heavily relied on scholarship grants, such as those from the CSC, which provide a stable number of high-quality PhD students annually. Our university's provision of top-ups made us an attractive destination for scholarship PhDs, resulting in 60% of our PhD students being scholarship PhDs, as stated in the SEP report.

To reduce dependency on this specific scholarship grant, we have engaged with our international strategic partners, including UGM in Indonesia, NTU in Singapore, and Osaka University in Japan, who have direct access to their local and national funding agencies. The current academic ambassador of RUG for Japan and South-East Asia is a staff member of ENTEG which enables us to have direct contact with these partners. PhD candidates (individual or double PhD programme) from these countries can obtain a scholarship from their own countries to conduct research in our institute. Increasing access to multiple countries will allow us to diversify the PhD scholarship portfolio in the institute.



To lower the proportion of PhD scholarship students, we have recently established the EDF to stimulate and increase the number of funded research projects. In this regard, we refer to our response in the previous section.

ENTEG has led the development of Engineering Doctorate (EngD) programmes in Autonomous Systems and Sustainable Process Design. These two new EngD programmes received their initial accreditation in June 2024 and the first cohort is expected to start their programme in September 2024. Through these EngD programs, we will stimulate further public-private-partnerships with industries in the region and at the national landscape. They can be combined with PhD and postdoc projects and are aimed at bridging innovation projects from low TRL to high TRL, bringing them closer to the industry/market. As also described in the SEP report, ENTEG researchers have successfully attracted research & innovation projects through regional funding, where they collaborate with industries in the region for R&D projects. ENTEG will continue stimulating these types of collaborations in the future and is included in the funding acquisition activities via the ENTEG Development Fund.

- Strategy to attract Dutch PhD candidates

**Response ENTEG:** The relatively low number of Dutch master graduates that continued to PhD study has been observed for one particular master's degree programme in Industrial Engineering and Management (IEM) and is not the case for the Chemical Engineering (CE) master program coordinated by Sustainable Chemical Engineering and Biotechnology domains. The reason behind this is that the graduates of IEM are well-prepared for industry careers, making them more likely to enter the workforce directly after graduation. On the contrary, the CE program stimulates the students to engage with the process industry and simultaneously heavily involves them in a research environment during their research projects. In recent years, the ENTEG staff is heavily involved in setting up new master's programs in Mechanical Engineering and in Systems & Control that are designed to educate academically-oriented graduates. More than 10% of the ME graduates have continued to conduct PhD study in our faculty, particularly, in ENTEG. We foresee that we can continue recruiting PhD students from these master's degree programs in the coming years.

We are developing further strategies to make PhD research more attractive to MSc students in general, including those from the IEM program. However, we do not specifically target Dutch candidates, as our MSc programs are internationally oriented, and we aim to provide equal opportunities for all students, regardless of nationality. As part of our commitment to strengthening European collaboration, we are in the process of submitting an Erasmus Mundus program to create a strong network of MSc programs in Systems & Control across Europe, which will help attract more EU MSc students to our research groups.

- Focus on TRL 1-5

**Response ENTEG:** ENTEG will maintain its research and innovation focus on TRL 1-5, where projects on TRL 4-5 will have a well-defined impact pathway to applications by external partners. For the latter, we refer to our earlier response on strengthening industrial partnerships. Particularly, the new EngD programmes in combination with our existing industrial partnerships in different ecosystems will be instrumental in bringing the fundamental research results to higher TRLs.

- Developing Metrics for engineering successes

**Response ENTEG:** Within ENTEG, we utilize various metrics in our annual meetings with PIs to ensure our research remains highly relevant and impactful. These metrics encompass research output, grant

acquisition, and successful industrial collaborations. We also assess financial contributions from partners and the impact of our PIs on startup success and spinouts. We monitor the number of patents filed by our PIs but priority is given to tracking licenses and technology transfer agreements as more indicative of real innovation. Regarding human capital, we monitor PhD student and postdoctoral researcher numbers, diversity, employment outcomes, and professional development.

Concerning developing metrics dedicated to engineering activities and in line with the national initiative on rewards and recognition, we will consider and revisit suitable metrics for ENTEG that take into account the different focus of all PIs in terms of scientific and engineering outputs, educational activities, impacts, and organizational aspects. We aim to do that without adding undue administrative burden. In the short term, we will establish an advisory board consisting of peers and industrial partners who can guide strategic decisions aligned with societal and industrial needs and with whom we can discuss optimal metrics and their implementation.

In summary, we are enthusiastic about implementing the committee's recommendations and believe these actions will strengthen ENTEG's research capabilities and societal impact. To ensure our actions yield the desired outcomes, we will implement a continuous improvement cycle with yearly reports to the ENTEG board to monitor our progress and allow for necessary adjustments. Additionally, we anticipate a review with the FSE board after three years to collectively assess our achievements and areas for improvement.

## ESRIG Response to the PRC Recommendations

- Develop a more active and strategic vision to reach the full potential for both scientific and societal impact, carried by clusters or units with critical mass, overcoming the viability problems of some units that currently seem sub-critical. Enhancing the visibility and impact of the institute, taking advantage of the strongest elements in the research programme.

**Response ESRIG:** We appreciate the observations from the committee. We made the unfortunate mistake to reuse an outdated organogram to represent our institute organization which does not communicate well enough about who we are and how we are aligned on our central themes. We clarified, in our discussion with the SEP, that we only work on three themes/societal challenges (and not 25): environment, energy, and sustainability. This correction was also sent to the committee but was ignored in their final report. The conclusion, regarding the sub-criticality of the units given the number of “themes” is, therefore, based on the wrong impression that propagated through the evaluation procedure. We are now working on an updated ‘organogram’ that better reflects how we currently collaborate around our three themes/societal challenges to conduct our research, educate MSc students (EES program, which was recently evaluated with high marks) and train PhD students and Postdocs as an institute. However, this will only follow the discussions on finding the best structure.

With regard to the finding of the SEP report that ESRIG consists of subcritical units: we do not believe we have subcritical units. Our units are similar to the “PI structure” which exist at some other institutes of the faculty. We have always had two larger units, which stem from the research groups that founded the institute. The institute as a whole has grown over time by adding new units following strategic opportunities such as the sector plan, reorganizations, external funding or scientific growth considerations. This growth is in line with our vision on energy, environment and sustainability. All these units are fully functional and essential to the long-term viability of our institute. Currently, each unit performs well academically and educationally, so the differences in “apparent mass” do not represent differences in “quality” or “international recognition”; all groups perform well. They all contribute to the high-performance numbers of the institute and its academic excellence. Scientific diversity has always been ESRIG’s strength. Having these units allowed us to respond flexibly to new opportunities such as the current revival of nuclear and the huge influx of funds for hydrogen to which we could only respond appropriately by having the human resources to respond and lead initiatives. We are exploring with all relevant staff how to better work together and explore new organizational structures and ways to communicate our work to the outside world. All of this is part of a healthy process that requires careful management, time, and resources rather than an externally forced quick reaction. The organizational form will follow the science as explained in the first item.

We will continue to concentrate our activities along the three societal challenges: environment, energy, and sustainability. We will also optimize the organizational form pursuing these frontiers, placing human resources and capital in the right places. This will improve internal and external communication while maintaining our key organisational strengths – scientific diversity and flexibility.

- Take initiatives to become a (co-)leader in sustainable energy research programming within FSE.

**Response ESRIG:** In all the committees formed by the board of the faculty to prepare the position papers on Energy, Sustainability, Health and the Digital World, members of our institute were involved as members of the writing committees actively shaping the direction and the content of future research initiatives at the faculty. We are also active in the Schools of the university holding leadership positions such as the hydrogen director of the WOS. ESRIG has been instrumental in shaping the

energy and sustainability agenda through forming and leading the Groningen Energy and Sustainability Program (GESp), a university initiative involving more than 300 energy researchers and industrial stakeholders. GESp was established in 2011, and was later used as a model and basic building block for the establishment of the Wubbo Ockels School (WOS). ESRIG serves as a highly interdisciplinary living lab within the university, providing a focal point for energy and sustainability (and environmental) research. Our vision is to strengthen this unique composition of expertise and resources within our institute further, by expanding our leadership roles within the faculty, university, nationally (e.g., chairing and co-chairing the Netherlands Energy Research Association, NERA) and internationally (e.g., four authors in the IPCC: 3 lead authors and 1 contributing author). We are happy to take further formal leadership roles but note that the chairs of the Faculty position papers were decided top-down. We are, naturally, ready to lead these initiatives formally when asked. Already, we are leading in these areas through initiating large research consortia and teaching initiatives as recognized also in the SEP evaluation.

- Transform the management structure of ESRIG so that staff is more included in strategy and policy development, making the structure more conducive to truly integrate research across units. This can help solving the issue of sub-criticality in some units. One suggestion is to have the management team managing ESRIG wide portfolios, instead of representing their own unit.

**Response ESRIG:** Our management board represents all groups reflecting our appreciation of our diversity and participation. In addition, we are working on having representation of each group of staff. We recently formed groups consisting of all PhD students, and we are in the process of organizing the technicians in a group, and we already have a long-standing master's student association (ATMOS). We plan to have, twice a year, a broad board meeting with all scientists and representatives of other groups at the institute to broaden participation across career paths and stages. This, in addition to our yearly away-days which have been organized in the past on a range of strategic and organizational topics with broad representation across the institute from professor to student. Based on the ongoing discussions outlined under the first item, a new organizational structure will be created including, possibly, a new management configuration compatible with the vision and the mission of the institute.

- Take initiatives, with assistance from FSE, to increase the hiring and retention of female staff.

**Response ESRIG:** We are making considerable efforts to step up our diversity and gender mainstreaming strategy to integrate gender considerations into all aspects of ESRIG's operation and hiring strategy to promote gender equality and attract excellent female candidates to ESRIG. These initiatives include and are not limited to the following:

1. Capacity Building: Provide training for staff on gender issues and gender-sensitive approaches to ensure they understand their importance and can implement strategies effectively. We are the first RUG institute to undergo multiple training sessions with the University's Diversity, Equity, and Inclusion Team. The first five workshops are currently being trialled with the largest subunit, IREES, and will then be modified and applied to the whole institute.
2. Communication and Awareness: Raise awareness about gender issues within the institute to foster a culture of gender sensitivity. Through the workshops, we will develop policies, reflect on norms, and modify our outreach materials, including the website and job advertisements, as part of our gender mainstreaming activities.

3. Adopting best practices: Work with other units on campus to share best practices and collaborate on gender equality initiatives. We have been setting up initial meetings to facilitate such exchanges and will actively participate in the University's activities on gender mainstreaming.
4. Retention efforts: Ask and seek advice on best practices from institutes that successfully increased their female diversity during previous hiring cycles. In terms of retention, we note that institutes like ENTEG and ZIAM were able to hire more new professors during previous cycles (than we were able to) and they used this opportunity strategically to increase their diversity by hiring primarily women with a well-tuned strategy to persuade them to come to Groningen, which greatly increased their viability. We plan to do the same following advice from other institutes that accomplished this, which will help acquire and distribute this knowledge across our institute, for which we will plan strategic meetings in coordination with the women in our community.

- Implement the new recognition and reward systematics to the full extent.

**Response ESRIG:** we have always followed the the university and faculty guidelines for our recognition and reward policy. We have even tried to go beyond the stated guidelines wherever justified. For instance, we have argued for a higher salary scale for secretaries, which is within the university regulations but beyond the faculty guidelines, without success. We are and remain fully aligned with and committed to implementing the new FSE recognition and reward policy.

- Develop an active strategy for grant writing to raise the number of external grants.

**Response ESRIG:** We follow UG and FSE best practices. We are always in the process of finding new partners for various research funding sources, be they of governmental, or industrial origin. In general, we believe we are doing reasonably well, as about 60% of our income comes from external funding. This number is well above the average within the faculty and the university.

- Reduce the average duration of the PhD projects.

**Response ESRIG:** We have implemented new measures for monitoring the progress of our PhD students. This includes having a supervisor from another group in the 9-month and 3<sup>rd</sup>-year evaluations. Further, we are systematically communicating with individual PIs regarding the progress of their students. This is based on the "traffic light" system, which we implemented a couple of years ago. Last but not least, we have announced that contract extensions after 4 years are not automatic anymore, and serious justifications are required.

Furthermore, we have introduced additional measures such as a dedicated annual away day to calibrate graduation criteria and advising support across supervisors; creating viable plans with all long-term students to finish; incentivizing staff to further improve their supervisory capabilities through taking offered courses by the corporate academy; close interaction with the graduate school and other institutes to exchange and adopt best practices; all contributing to changing the supervisory culture. Critically, we involved our PhD students in this away day so that their voice guided our policy improvements to enable them to graduate faster. Finally, our PhD coordinator is in constant contact with the Graduate School of the Faculty, discussing developments at the institute and at GSSE and implementing new policies at the institute accordingly.

These steps are being carefully implemented and continuously evaluated, and done in collaboration with staff and students. The results will only be clear in a few years.

- Closely monitor social safety and inclusion and consider implementing best practices from other institutes.

**Response ESRIG:** The institute director and the board members partook and encouraged all their staff to follow the training offered by the university, such as the active bystander program. We, as an institute, are committed and also take initiatives (such as the one mentioned regarding gender issues) very seriously. We are committed to actively engaging in changing the culture and providing a welcoming and supportive working environment. We are in the process of developing effective diversity and gender plans with input from the faculty and leaders at other institutes who successfully made this transition.

## GBB Response to PRC Recommendations

- Appointing a scientist (group leader) to run GBB's facilities as a shared facility

**Response GBB:** We are very happy with this recommendation, because the sharing of equipment is a core value of GBB, but continuity in training and maintenance is sometimes challenging. At the GBB retreat of March 2024, this recommendation has been discussed with all GBB staff. We will continue to discuss how to organize facilities in future staff lunches or retreats, and aim for a consensus decision in the next academic year. A new group leader in the biophysics field, who will be needed because of imminent retirements of Poolman/Driessen could head a facility for biophysical instrumentation. Alternatively, a facility scientist could run a facility, similarly to how Mammalian Cell Culturing, Mass Spectrometry (with Stratingh) and Electron Microscopy are facilitated. In the near future, and once the outdated in-house X-ray equipment has been removed, GBB will have some space to expand the electron microscopy facility at the Linnaeusborg, and potentially include (advanced) optical microscopy or analytical biophysical instruments. This will elevate control on equipment use and maintenance, with joint and timely actions for reinforcements and/or replacements.

- Lead discussions with FSE to establish the "rules of independence" (financial, strategic)

**Response GBB:** Initial discussions were part of a Director's meeting to showcase how at present 2 FSE institutes operate regarding their running budget (i.e. VSI and GBB). Given the differences in playing fields (e.g. costs of experimental research, importance of technical support) and size of the institutes, the financial and strategic independence requires further discussion. However, meaningful plans cannot be drawn given that the financial position of the Faculty and its institutes is uncertain for coming years. Nevertheless, GBB will keep the increased independence high on its priority list.

- Develop a culture of timely PhD completion.

**Response GBB:** At the aforementioned staff retreat, we have also discussed measures for further reducing the PhD completion time. The plans have already been submitted to the Faculty board and will be prepared for implementation (i.e. measures that require standard additions to the TSPs) from September 1, 2024.

- Develop metrics to measure successes in knowledge transfer to users and to exploit them in future research applications motivating the importance of fundamental research.

**Response GBB:** We believe that an analysis of the value of GBB research could be important in raising awareness for the economic impact of our research in the long run. Likely, also other institutes could profit from such an analysis including the FSE institutes that were not assessed in the current round. Since we are not equipped nor have experience for such an analysis, we suggest to organize this at the Faculty level. We believe that an objective external expert will be able to provide the FSE and institute boards better insights that can be beneficial in demonstrating and promoting the importance of fundamental research, for instance in conjunction to SDGs, the FSE challenges (and their positioning for Nij Begunn), the RUG Schools as well as regional and (inter)national stakeholders.

## GELIFES Response to PRC Recommendations

- Work towards the situations that the duration of PhD trajectories does not overshoot the normal project duration of 4 years.

**Response GELIFES:** GELIFES acknowledges that the average PhD duration is too high. The institute has taken several measures to reduce completion time such as i) a minimum recommended number of three first authored chapters, ii) recurrent PI group writing retreats, iii) implementation of a cohort structure, iv) progress monitoring through a mandatory five-minute form (with a follow-up led by the PhD Coordinator) and v) more attention to social safety as students should feel comfortable to openly bring their concerns to their supervisors, the PhD Coordinator or the confidential advisor, allowing for an early resolution of difficulties they might face during their trajectory. Nevertheless, the institute sees that this set of measures might be insufficient and therefore will implement the following course of complementary actions:

- improvement of recruitment procedures which will include a rigorous assessment of scientific maturity and English proficiency via the writing of a research proposal for a committee of at least two supervisors and at least one 'external' colleague with ample supervision experience without direct links to the project;
  - merging PhD advertisements, in order to attract a larger and higher quality pool of candidates;
  - introducing a PhD monitoring committee (PMC). The GELIFES PhD and Postdoc Committee is currently developing a PMC protocol, supported by the information gathered through the five-minute progress form and part of the R&O meeting reports. The PMC will be entitled to ask students to develop an amended project plan with their supervisors when they anticipate (on the basis of reported progress) that the original plan will not be completed within the four-year contract.
  - improving decision-making at the go/no-go moment (e.g. with the support of the PMC), ideally backed up by a financial contingency plan, funded by the Faculty.
- Continue efforts to improve the gender balance for senior staff.

**Response GELIFES:** This matter remains high in GELIFES priorities and measures in place have proven to be efficient as the ratio female/male among scientific staff has been increasing (ratio of 38%/62% in December 2023). GELIFES acknowledges that the number of female scientists in advanced stages of their career is relatively low. The number will increase due to recent hires of four female tenure trackers who are expected to become associate professors within three to five years. Following FSE's target of at least 25% of women full professors and 35% of associate professors, GELIFES expects to achieve these numbers in nine years time. Furthermore, the institute continuously seeks support on this matter from FSE's but also existing networks such as Women in Science (WISE), Young Academy Groningen (YAG) and Young Science and Engineering Network (YSEN), all of which are highly committed through specific programs to close the gender gap within academia.

- Develop an action plan to increase the number of grant proposals to NWO, EU and other funding sources.

**Response GELIFES:** GELIFES is currently developing a comprehensive Research Management Framework which entails a short and long term strategy that will align individual research interests with broader institute goals, championing collaborative and interdisciplinary approaches, and



enhancing GELIFES visibility and recognition in the global research landscape. This comprehensive analysis aims at i) enhancing visibility through strategic analysis, ii) positioning into targeted niche areas, iii) capacity building and iv) operational focus. Furthermore, GELIFES is confident that the Strategic European Partnerships Initiative (SEPI) launched in the last quarter of 2022 will further stimulate collaborations with European colleagues around the institute's thematic research domains, such as, for example, wildlife and biodiversity, advancements in agriculture and plant science, genomic functions, neurobiology and behavioral neuroscience, eco-evolutionary dynamics, and chronobiology innovations. The above-mentioned inventory state of play exercise is the starting point for this approach. Teams of GELIFES researchers with similar interests are working together to initiate joint work with carefully selected European Institutions (Horizon Europe champions in various research areas). This exercise also proved a willingness of PIs in taking risks and an openness to change and experiment, very much aligned with the recommendation of the PRC. Furthermore, the institute has seen a substantial increase in grant applications, where over 70 proposals were submitted to a wide variety of agencies and charities throughout 2023.

- Develop a strategy to increase success in the competition for personal grants (VIDI, VICI, ERC).

**Response GELIFES:** GELIFES management acknowledges the necessity to improve the success rate at the level of (prestigious) individual grants such as those that fall under the NWO Talent scheme and, naturally, individual grants funded by the European Research Council. With the support of GELIFES Funding Officer, the recent tailor made funding plans provide a roadmap for securing future funding while ensuring the continuity and sustainability of the research. Early stage researchers have been very well supported in this matter and therefore the number of individual grants should grow in the upcoming years. GELIFES aims at increasing additional provisions to actively support researchers from an early stage with grant writing, in collaboration with the University's Talent Development team. Furthermore, GELIFES expects that the Faculty considers the possibility to grant embedding warranties for external PIs who are applying to grants such as VIDI and VICI but also ERCs. If this is allowed, an active scouting effort to identify potential successful candidates will be implemented.

- Develop quantitative metrics to measure successes in the flow of knowledge to users, as that can strengthen the visibility of the institute and develop a publication strategy that reinforces the unique, interdisciplinary nature of GELIFES, and allows for a focus on impactful publications.

**Response GELIFES:** GELIFES will discuss with the Research Intelligence Unit (RISe) of the University of Groningen what options there are for measuring GELIFES success.

- Better message the uniqueness of GELIFES on a global scale and improve visibility and branding of the institute. Increasing the number of top journal papers is an important part of this.

**Response GELIFES:** Our recently established Outreach and Communication Committee will develop a plan further than actively maintaining the institute's website and should expand social media presence beyond the level of individual staff members, to be concluded before the end of the year. In addition, GELIFES will seek support from the Faculty on outreach activities by engaging in a more systematic way with the *Newsroom*, which is committed to improve FSE science communication and support the institute's strategic actions. GELIFES is also contributing to the position papers that the Faculty wishes to develop on main four flagship domains, including health, sustainability, digital and AI, energy transition and climate adaptation.

We disagree that increasing the number of top journal papers is an important part of this target. It has been shown (Lozano, G.A., Larivière, V. and Gingras, Y., 2012, *The weakening relationship between the impact factor and papers' citations in the digital age*. J Am Soc Inf Sci Tec, 63: 2140-2145) that the impact of a publication is not so highly correlated with the impact factor of the journal, because the latter is mostly determined by a few very highly cited papers. In fact, low-profile society journals may have a larger impact in the long run. Furthermore, targeting high impact journals stands in sharp contrast to the Declaration of Research Assessment (DORA) guidelines and may introduce challenges that can extend the length of PhD trajectories. In summary, GELIFES agrees that the institute should aim at increasing the citation rate of publications, but this does not necessarily imply publications in high impact journals.

- Establish an international advisory board.

**Response GELIFES:** The PRC suggestion to actively engage with the Scientific Advisory Board (formed in 2015 to support the implementation of the Adaptive Life program) is well received and the management of the institute will ask for their comments and suggestions on the PRC report.

## Stratingh Institute for Chemistry response to PRC Recommendations

- Develop effective strategies to increase impact of research projects using the impact plan methodology, develop metrics to measure success in knowledge transfer to users.

**Response Stratingh:** We thank the committee for their constructive feedback. We agree that the institute should do more to make especially our young researchers (PhD/postdoc) more aware of the possibilities of starting companies based on the science and technology developed in the institute and encourage them to do so. The institute will develop a strategy for this.

- Continue initiatives to improve the gender balance using the three PI vacancies that can be filled as a start.

**Response Stratingh:** Our intention was to use these vacancies to improve the gender balance and diversity of the institute staff, as suggested by the committee. Concrete actions were already taken:

- the vacancy text of a tenure track position was adapted according to suggestions from recruitment experts to make it more attractive to female candidates
- scouting was initiated: this includes discussions were engaged with an executive search company and young female researchers (post-docs, group leaders) from other universities were invited for a 1-day visit (that included discussion with our staff members). This will continue in the future as scouting will remain a continuous effort, allowing us to be well connected to excellent young scientists and their network to create a pool of potentially interesting candidates for future positions.

Unfortunately, the recent hiring freeze has put on hold our efforts on this front. Scouting will continue in spite of this hiring freeze.

- Implement an international advisory board to advise on the internal and external strategy of Stratingh.

**Response Stratingh:** We agree there could be value in having an international advisory board. The institute has started discussion on what it would expect from such an international advisory board and identifying potential members.

- The committee noted that, as in all FSE institutes, the duration of PhD trajectories at Stratingh is too long. Stratingh should develop measures to reduce the PhD duration. As described in Chapter 2, the committee recommends this is done through an FSE-wide initiative, with support of GSSE.

**Response Stratingh:** Reducing the PhD duration has our continuous attention. A plan to address this issue was discussed during the yearly administrative meeting with the Faculty Board and was approved. Efforts on recruitment, monitoring and teaching load have already taken place.

- The committee encourages the institute to be prepared for ethical discussions that can come up in the field of artificial systems that mimic (aspects of) living systems and warns that it is best to actively initiate such discussions at an early stage from within the institute.

**Response Stratingh:** Steps have been taken since the SEP interview: a collaboration with an expert in Applied Ethics has been set up, with concrete actions such as the addition of this expert to a consortium grant application.

- Develop a centralised budget (such as the suggested mission budget) which can be used to increase the organisational and technical/ administrative support after the rapid growth of the research programme over the last couple of years.

**Response Stratingh:** Such a budget has been set up, with the ambition to support groups (in the form of a money loan) during financially difficult time to allow them to join initiatives where matching is needed, 4<sup>th</sup> year of a PhD has to be paid, etc. This budget is in principle not to hire people at the institute level (e.g. support), we believe that this should be supported by the faculty (and when possible paid, at least partially, by large initiatives).

- Other opportunities for smaller projects (with one or a few PIs) within NWO programmes (OTP, KIC, Perspectief-grants, etc.) are also logical to be explored further.

**Response Stratingh:** We thank the committee for these suggestions and will include them in our future funding plans and strategy, and will share more information on these possibilities with our staff.

- The committee strongly suggests that Stratingh actively advertise this (Green Labs) initiative on a worldwide scale. This would constitute one example of an impact plan activity, following the methodology mentioned above.

**Response Stratingh:** We agree with this advice and note that this is already ongoing, although not yet in the frame of an impact plan: a perspective article on [the relevance of sustainable lab practices](#) was published in RSC Sustainability and received great (online) attention (e.g. the first author was invited to present this article at the Dutch Green Labs national meeting).

## VSI Response to PRC Recommendations

- Expand the links with Nikhef that has much to offer from which VSI could benefit. Hold yearly meetings with the Nikhef eEDM committee.

**Response VSI:** We consider the partnership with Nikhef as the most important one among our existing collaborations. We participate in the Nikhef scientific portfolio through the eEDM, LHCb and theory programmes, and co-determine the general future directions of research in particle physics in the Netherlands through the Nikhef collaboration. With Nikhef we share PhD students and the (C3) PhD monitoring system, join forces in funding applications, participate in Nikhef-wide committees, etc. VSI staff members often have longstanding ties to Nikhef and (new) PhD researchers strengthen these. The bonds are thus strong and warm, but we do agree with the SEP committee that we could take even more advantage of what Nikhef has to offer – with mutual benefits - especially regarding technical support. To this end, we put in specific requests to the Nikhef board, but also to the Nikhef eEDM committee that will return to its yearly frequency from before the covid pandemic, with a first site visit in July 2024. Co-financing by Nikhef of a temporary position for a technician in anticipation of an upcoming retirement has recently been committed.

- Consider focusing on fewer (large-scale) experiments.

**Response VSI:** The primary experimental focus of VSI is on the eEDM experiment that is hosted locally and on the LHCb experiment at CERN. While several staff members are involved in other experiments, this often has a different nature. For instance, some staff members in the Cosmic Frontier are working on developing advanced techniques for the analysis of data from astro-(particle)- physics experiments (of which some are already decommissioned/finished and some are still in the future), where the same type of analysis can be performed for multiple experiments, each with their own specific, large data sets. Access to this huge amount of data benefits the researcher as it enhances the chance of scientific success. Important to note: this does not imply that VSI as an institute has joined these experiments, and as such we do not have financial or time-investment obligations for these experiments, such as compulsory experimental shifts or membership fees. The same applies to some theorists at VSI that focus on different experiments, precisely because of the benefits of combining results from various complementary measurements. Also, we wish to note that currently, the number of temporary staff (PhD and postdoc researchers) working on the eEDM experiment is much larger than those working on other experiments in the Precision Frontier. Moreover, as we emphasized in our self-evaluation, two staff members in the Precision Frontier work on other experiments that also involve ion manipulation and trapping techniques, allowing mutual benefit from each other's expertise.

The committee rightfully noticed "somewhat of a balancing act between creating synergy through strategic consolidation of resources and giving (young) PIs independence". We indeed encounter tension between the institute's desire and need to create research teams with sufficient critical mass and stimulating team science on the one hand and the independence of PIs that is required of tenure trackers on the other hand. One of the criteria of the Career Paths in Science and Engineering (CPSE) is that "the staff member has built up a strong research group based on their own research line [...]" This promotes diversification, as joining an existing research line runs the risk of not meeting this criterion. This is not only disadvantageous for the institute, but also for staff members themselves as they may miss out on the advantages of joining forces. To solve this tension, a rephrasing of the promotion criteria could help (to acknowledge original and identifiable own contributions to an existing research line), while of course still judging the PIs on their individual merits and contributions to team science efforts. As a change of policy in this regard requires a

change in the CPSE formulations, this is up to the Faculty Board to consider. We would be strongly in favour of such a change as the current formulation forms a source of additional stress for young PIs.

Finally, we would like to say a few words about our experiences with hiring PIs for work in a collaboration or on a specific topic as a worry could be that this may lead to lesser quality candidates. For the VSI, this has never been a problem. We have always been successful in finding the right candidates - of very good scientific quality - for open tenure track positions. There is thus no problem with the pool of suitable candidates.

- Increase the focus and effort for the eEDM experiment that has world-level potential if successful, while maintaining a good balance between the frontiers. Reaction VSI:

**Response VSI:** This spring the eEDM experimental set-up has been moved to the new lab in the Feringa Building and is in the process of being reassembled into the next phase of the apparatus. This major step forward marks a new stage for the experiment and the focus is now to come to a first fully analysed measurement of the electric dipole moment of the electron in diatomic molecules. One of the critical aspects in ensuring that the eEDM program continues to run successfully is the extent and continuation of the technical support. Currently, the VSI has two technicians who both are crucial for the experiment. One of them, however, will retire 3.5 years from now. The VSI needs a) continuation of this position and b) sufficient overlap to guarantee a smooth transition and stable support. In consultation with Nikhef, we have explored the recruiting of a new technician to transfer knowledge and ultimately replace the retiring technician. Nikhef committed financial support enabling this as soon as we can fill the position. This allows for a 'dakpan'-construction which creates overlap between the technicians and, thus, training of the new technician and transfer of knowledge. In addition, we aim for an increased role of the Nikhef mechanical and electronics workshops, the CIT department and the R&D department to reduce long development times for experimental hardware and software. While the current financial situation leaves no room to hire a new scientific staff member, we have to optimally use the people we have available. Therefore, redistributing other tasks - e.g. management or education tasks - of the permanent staff involved would help to accelerate the completion of a first measurement. In addition, we have been very successful in acquiring funding for temporary research staff (PhD and postdoc researchers) and are in the process of filling these positions.

- Create (further) links with high-tech equipment companies such as ASML and VDL and benefit from each other's technology.

**Response VSI:** We agree that creating links (and strengthening existing ones) with high-tech equipment companies could be beneficial for both parties. For that reason we are determined to exploit our existing connections with the high-tech industry - e.g. Borschevsky with ARCNL - and to actively pursue to expand these. To this end, we will organize a networking/matchmaking event with high-tech companies in connection with the opening of the new eEDM laboratory (end 2024/ early 2025). In consultation with Nikhef and the Research, Strategy and Partnerships-team of FSE, we will invite key representatives from R&D departments of companies such as ASML, ARCNL and Shine. This event serves as a good opportunity to profile the VSI and showcase our development of high-tech instruments and make connections with companies for future collaborations. It should, however, also be noted that the VSI needs to safeguard the balance both within the precision frontier (theory-experiment) and between the three frontiers of the institute as a whole.

- Consider allowing associate professors in management positions, like the directorship of VSI, to reduce the managerial workload for the small group of full professors and to allow associate professors to gain experience in management positions.

**Response VSI:** We fully agree with the committee that the current managerial workload weighs (too) much on a (too) small group of people and could be distributed better. Therefore, within VSI, we already started involving associate and even assistant professors wherever possible (e.g. VSI Board, chaired by an associate professor, 2 recent members are assistant professors). However, the criteria for director positions are determined at the faculty level and currently require the scientific director to be a full professor. Although the number of full professors in VSI is very limited, it is expected to grow in the near future, but the interest in becoming scientific director may well remain limited. As long as we are bound to the faculty's criteria for eligible candidates, we do see more potential in making the director's position more attractive, e.g. by increasing the compensation or by enhancing the mandate of the director. In this spirit, VSI has started reserving part of its budget to top up the compensation from the faculty, such that the director will be able to hire a two-year postdoc in the second term of the directorship. This provides concrete support for the director's own research group, which has helped the current director very much.

# Zernike Institute for Advanced Materials Response to PRC Recommendations

## Ad 4.2.2 Internal Strategy

- (...)In the interviews several PIs indicated a struggle with a high teaching load, and it was mentioned that increased support by teaching assistants is desired.(....)
- (...)The committee noted that, as in many FSE institutes, the duration of PhD trajectories at ZIAM is too long, although this can be partly assigned to the effect of the pandemic, ZIAM should develop measures to reduce the PhD duration.(...)

**Response Zernike:** Recognizing the importance of supporting both our staff and PhD researchers, we have started to implement several strategies to address PhD duration and teaching support. PhD researchers form the largest group of staff at the Zernike Institute, making up almost two-thirds of our team. Their role in research and education is essential for our success as a leading materials research institute.

Employed PhD researchers are required to allocate 10% of their contract to teaching activities, which include supporting practicals (e.g., labs), guiding tutorials, and supervising BSc/MSc students. Currently, on average, employed PhD researchers spend 5-6% on teaching. At the same time, the teaching load is very heterogeneous across our staff. By increasing the proportion of time PhD researchers spend on teaching (up to their assigned 10%) and spend more effort on managing the teaching load per PI (either up or down), we aim to bring the teaching load of all to the expected level. It has to be added that many PIs experience high load due to the administrative tasks around teaching as well as the (too) large number of small courses (requiring large efforts compared to the obtained teaching hours). Active new policy will be implemented to reduce the number of small courses and the courses that remain will be rewarded somewhat more hours. The entire teaching administration system is currently changing also aiming to alleviate pressure as well as provide a fairer distribution of hours (according to efforts).

To reduce the average duration of PhD projects, the institute's policy focuses on steering and supporting the completion of PhD projects within the assigned four-year term. Although the responsibility for the successful completion of a PhD project lies with the PhD researchers and their supervisors (and they will be held accountable in R&O meetings), the Zernike Institute management has decided to provide additional, structural support. This includes ensuring high-quality candidate selection, proper expectation management and communication (towards student and supervisor), professionalization of supervision (incl. InterVision), and sound planning towards four-year PhD trajectories (with an independent monitoring/advisory committee).

We believe these measures address both the high teaching load experienced by (some of) our PIs and the need to reduce the duration of PhD trajectories. By offering structured support and clearly defined policies, and communicate clearly about these, we aim to create a sustainable environment where both research and teaching can thrive.

- Ad 4.5. Viability(...) ZIAM should reduce its strong dependency on fellowships from other countries (...). With fewer funded scholarships/fellowships and the end of the BIS funding, ZIAM needs adjustments in its funding strategy, including a larger focus on NWO and EU grants. It can also expand its collaborations with industrial partners through, e.g., NWO OTP, KIC and Perspectief-grants.



**Response Zernike:** The Zernike Institute has been proactive in prioritizing its funding strategy since 2017. In 2021, we hired a new funding officer focused on collaborative EU grants. Since then, we have streamlined internal processes, tailored support, and as such increased the number and diversity of grant applications. This approach is paying off: we have recently been awarded national NWA-ORC, NGF, Perspectief, NWO M, NWO XL, and NWO OTP grants, as well as EU-funded Pathfinder, Doctoral Networks, and ERC Synergy grants. These successes also highlight the effectiveness of our focus on collaborative grants.

The acquired funding enables us to take significant steps toward greater independence from scholarship students from other countries (which is now roughly 25%, and a mix from China, Mexico, Colombia and other countries). With our processes successfully integrated and these positive examples, we anticipate that our entire staff will (better) utilize our internal services. Combined with the committee's endorsement of our research quality, this will help secure the financial resources needed to conduct our research more freely.

Industry collaborations are the main core of the awarded NWA-ORC, NGF OTP grants. Additionally, we will address the committee's recommendations to expand our collaborations with industrial partners even further through mechanisms such as NWO OTP, KIC, and Perspectief grants (see also below).

- Ad 4.6 Conclusion and recommendation Maintain and consolidate the balanced multidisciplinary research programme.

**Response Zernike:** We are grateful for this recommendation on our specific question regarding the institute's diversity and size and will maintain and consolidate our multidisciplinary research programme.

- Develop effective strategies to increase impact of research projects using the impact plan methodology and develop metrics to measure successes in knowledge transfer to users.
- Enhance collaboration with companies through small-size (one or a few PI) public-private-partnership programmes.
- Enhance activities to file patents and transfer or license them to relevant parties.
- Connect to industry roadmaps and inform itself about future industry needs in, e.g., the semiconductor industry and sustainability.

**Response Zernike:** The Zernike Institute asked the committee specifically how to enhance and stimulate technology transfer. The institute gratefully accepts the multifaceted recommendations to develop strategies that increase the impact of our research projects.

The impact plan methodology is an excellent suggestion to raise awareness of the various impact aspects in each project. For example, the online impact workshop provided by NWO can be readily introduced to guide and inform our team. Moreover, much experience can be gained from the impact plan methodologies as have been developed for and are currently being pursued in our NWA-ORC and NGF programs. At the same time, some of our PIs are actively involved in CogniGron and HTRIC; both clusters focus on the entire innovation chain for neuromorphic computing and health technology, respectively.

Additionally, we will develop metrics to measure our successes in areas such as research output, technological innovation, sustainability impact, education and training, and collaboration and outreach. We will install an institutional IP committee (with some of our internal PIs that have industrial experience) to

help our PIs to identify possible impactful discoveries to patent and/or commercialise. At the same time we are working together with the university's (research and) impact and venture teams (which are currently being reorganised) to capitalise better on our discoveries, for example towards start ups. Finally, we will inform our PhD students and PostDocs better on these possibilities (e.g. starting a company), help them towards appropriate training and funding schemes (as currently being developed at RUG central level).

We anticipate that a clear institutional impact plan will directly influence other recommendations, including collaborations with companies, defining high-impact research areas relevant to industrial roadmaps, identifying patentable intellectual property, and proactive participation in industry roadmaps (e.g., by attending relevant industry conferences and workshops). The latter we are definitely already doing, with some of our PIs actively involved in Topsectors, strategy working groups like Materialen Roadmap, Nationaal Actieplan Batterijen, Nationale Technologie Strategie, Beethoven project, Nij Begun, national and regional research centres, etc...

Our recent patenting activities, industrial partnership programs, and start-ups will serve as convincing role models to motivate other researchers on our team to pursue an impact pathway approach.

- Continue the pathway to improve the gender balance and setting an example for other FSE institutes.

**Response Zernike:** We are very proud of our diverse team and the achievements we have made together; diversity is our enabling factor to be a “powerhouse of materials science”. We are glad that the committee acknowledges our successes around gender balance and we will continue to foster it in all areas of operation.

- Develop measures to attract more graduates from the Groningen master's programmes to the ZIAM PhD programme and to increase the fraction of Dutch-trained masters and PhD candidates.

**Response Zernike:** This recommendation aligns perfectly with the institute's strategic goals regarding education (see 3.2.6 self-evaluation). Our aim is to increase the influx of students into the BSc and MSc programs related to the institute's activities, thereby ensuring a sufficient pool of highly trained candidates for the ZIAM PhD program. To achieve this, we collaborate with the student recruitment team to showcase our research, highlight the career paths of alumni, and provide other relevant information. Moreover, after a curriculum committee has been active, improvements have been made and are currently implemented in the bachelor and master programs Applied Physics (also to make the bachelor programs Physics and Applied Physics more distinct) in order to make the bachelor students more enthusiastic to enroll in the master program. These activities are primarily driven by ZIAM staff.