Year in review 2019-2020

Eindhoven
Young Academy
of Engineering
Preface

Eindhoven, September 2020

In the fall of 2017 rector of TU/e, Frank Baaijens initiated the Eindhoven Young Academy of Engineering by asking Patricia Dankers to set up the EYAE. In 2018 we welcomed our first delegation of members. Now, only two years later, the EYAE is a lively community of scientists, designers and engineers who work with great dedication to make the TU/e better every day. It is recognized as an important and constructive voice of young scientific staff within TU/e.

In our second year we have written advice on retaining talented female staff in relation to the Irene Curie Fellowship Program, discussed various policies, for instance concerning rewards and recognition, spoken about the impact of covid-19 and have been involved in the new alliance of the young academies of WUR, UU and UMCU.

As of September, most of the current members of the board will come to the end of their term. They wish the new board, which will consist of Yoeri van de Burgt, Sandra Loerakker, Oana Druta and chair Daniel Lakens all the best for the coming year.

Patricia Dankers, chair of EYAE
Job Beckers, member of the board
Yoeri van de Burgt, member of the board
Sandra Hofmann, member of the board
Rozemarijn Schalkx, secretary to EYAE
Members and board

a. New members 2019 and mutations

In May 2019 the application for new members opened. Contrary to the year before, deans were asked to send out the application, but not nominate someone themselves. Current EYAE members were also asked to ask suitable colleagues to apply. The call was also put on twitter and the website. In the end 8 candidates applied for 7 positions. One person withdrew. Patricia Dankers, KNAW-member Remco van der Hofstad and Mathias Funk interviewed all candidates, supported by Rozemarijn Schalkx. As all 7 candidates were very suitable they were accepted as members. They are:

1. Yoeri v.d. Burgt (Mechanical Engineering)
2. Tugce Martagan (Industrial Engineering & Innovation Sciences)
3. Yali Tang (Mechanical Engineering)
4. Sandra Loerakker (Biomedical Engineering)
5. Oana Druta (Built Environment)
6. Daniel Tetteroo (Industrial Design)
7. Sofie Haesaert (Electrical Engineering)

They joined the 2018 members

8. Mathias Funk (Industrial Design)
9. Maarten Hornikx (Built Environment)
10. Emanuela Bosco (Built Environment)
11. Jim Portegies (Mathematics & Computer Science)
12. Kevin Verbeek (Mathematics & Computer Science)
13. Decebal Mocanu (Mathematics & Computer Science)
14. Patty Stabile (Electrical Engineering)
15. Alex Alvarado (Electrical Engineering)
16. Tom de Greef (Biomedical Engineering)
17. Sandra Hofmann (Biomedical Engineering)
18. Rong-Hao Liang (Industrial Design)
20. Hanneke Gelderblom (Applied Physics)
21. Timothy Noël (Chemical Engineering & Chemistry)
22. Jan Philipp Hofmann (Chemical Engineering & Chemistry)
23. Ilja Voets (Chemical Engineering & Chemistry)
24. Tom Oomen (Mechanical Engineering)
25. Daniël Lakens (Industrial Engineering & Innovation Sciences)
26. Krist Vaesen (Industrial Engineering & Innovation Sciences)
27. Patricia Dankers (Biomedical Engineering)

In the spring of 2020 Decebal Mocanu left to become assistant professor at the University of Twente. Jan-Philipp Hofmann accepted a full professorship at TU Darmstadt. Timothy Noël will become full professor at the University of Amsterdam per 1 September 2020. We wish them all great success in their future endeavors.

b. Board

Patricia Dankers set up EYAE and was appointed the first chair by the rector. The members of EYAE elected 3 other members to be part of the board, Jan Philipp Hofmann, Job Beckers and Sandra Hofmann. Jan Philipp Hofmann left TU/e in the spring of 2020. Yoeri van de Burgt was chosen as a new member of the board as of 01-04-2020. Before the summer of 2020, the procedure for new members and the chair was revised. To make the position of chair more attractive, it was decided to work with a one year term and appoint a vicechair, also for a year. This change of the regulations was accepted in the meeting of July 7 2020. Daniel Lakens has been found willing to chair EYAE from 1 September 2020 onwards for a year. Yoeri
van de Burgt has accepted the position of vice-chair. Oana Druta and Sandra Loerakker will join the board from September 2020 onwards.

Collaboration with other academies
Almost all Dutch universities now have young academies. Job Beckers and Rozemarijn Schalkx were present at the national meeting of October 31st 2019. Oana Druta and Yali Tang were present at the online national meeting on June 9th 2020.

EYAE also contributed data to the invitation of De Jonge Akademie on requirements for tenure tracks. In July 2020, EYAE supported a statement initiated by De Jonge Akademie on support for young researchers whose career is impacted by covid-19.

Finally, EYAE is a partner within the Alliance between TU/e, Wageningen University, Utrecht University and Utrecht Medical Centre. More information can be found on page 5.

Finance
EYAE is supported by the executive board who provides a secretary (in-kind) and funds for organizing events and meetings. Total expenses for the period July 2019-June 2020 were 4040 euro. This is significantly lower than for the first period EYAE existed (April 2018-June 2019), which was 10500 euro. This can be explained by the fact that the first period of EYAE included a start-up phase and for that reason was longer, our weekend away had to be canceled because of covid-19 and fewer catering was necessary because we met online.
Contributions to our aims

The aims of the EYAE are:

1. **Being a platform for young academics for open discussion**
2. **Providing support for early career researchers at TU/e**
3. **Fostering interdisciplinary cooperation and research**
4. **Fostering excellence in education**
5. **Contributing to valorization (knowledge transfer) and outreach**
6. **Advising on policies regarding scientific research, education, valorization, outreach and impact both inside and outside TU/e**

Each year we report on the contributions we have made with regard to these aims.

1. **Being a platform for young academics for open discussion**

In 2019/2020 we had 8 regular meetings. Because of covid-19, our weekend away unfortunately fell through. Meetings were usually 2 hours. 3 meetings were held via teams because of the lockdown in spring 2020. We discussed a variety of topics, often with guests. Examples are:

   - Rewards and Recognition
   - Research Support (with Robert van der Drift)
   - The Irene Curie Fellowship program (with Julma Braat and Corlien van Dam)
   - Diversity within TU/e (with diversity officer Eva Demerouti)
   - Research integrity

2. **Providing support for early career researchers at TU/e**

The advice ‘Strengthening the position of early-career researchers in a changing funding landscape’ was especially meant for supporting early career staff. Also, we supported the statement of De Jonge Akademie on the possible impact of covid-19 on young researchers.

3. **Fostering interdisciplinary cooperation and research**

The executive boards of Eindhoven University of Technology, Utrecht University, University Medical Center Utrecht and Wageningen University & Research have invited their respective young academies to work together to address societal challenges as a subgroup within the Strategic Alliance between the four partner institutions. The official launch event of this alliance on March 11 2020 had to be cancelled because of covid-19. Designated members of the various Young Academies (from Eindhoven: Daniel Tetteroo, Daniël Lakens and Sandra Hofmann) have continued working on this alliance in the background, and a proposal was submitted to the Rectors and the General Board of the Alliance. This proposal has received a positive assessment on June 25th 2020 and a Budget of € 6 Mio has been granted to the efforts of the Young Academies over four years (given a positive review in 2021). This money will be used to build a Centre for Unusual Collaborations that facilitates and fosters Unusual Collaborations to address societal challenges, for example with grant money. More information will follow soon, the first call for grant money will open in September 2020.
4. **Fostering excellence in education**

EYAE has discussed how excellence in teaching may be recognized and rewarded. A delegation of EYAE was present at the Lanaken strategy days in spring 2019. The executive board made a request to EYAE to think about what excellence in teaching means. Jim Portegies, Alex Alvarado and Daniel Lakens are still working on an advice on this topic, specifically on how to improve the ‘BKO’.

The dean of the bachelor college invited EYAE to discuss the Education Vision 2030 with him. Kevin Verbeek, Sofie Haesaert and Sandra Hofmann attended this in-depth discussion.

![Sofie Haesaert, Kevin Verbeek and Sandra Hofmann discussing the education vision 2030](image)

5. **Contributing to valorization (knowledge transfer) and outreach**

Together with the TU/e Center for Humans & Technology, EAISI and Studium Generale, EYAE hoped to organize an interdisciplinary event on creativity and AI. Because of covid-19, this was postponed to September 16, 2020. This will be an online event. EYAE-member Jim Portegies will be one of the speakers.

EYAE has its own website and twitter account, accessible for all members. The account has 188 (was 68) followers and is mostly used to communicate about events and news about our members and to keep in contact with other young academies.
6. Advising on policies regarding scientific research, education, valorization, outreach and impact both inside and outside TU/e

EYAE wrote the following advice documents:
- ‘Strengthening the position of early-career researchers in a changing funding landscape’, which was discussed with the deans, the executive board and the Innovation Lab.
- ‘EYAE Advice on attracting and retaining female scientific staff’. This was discussed with rector Frank Baaijens and Julma Braat (HR). Baaijens has asked EYAE to set up interviews with young staff to find out more about their motivations to stay in or leave academia.

It has also sent a resume on the discussion on rewards and recognition within EYAE to the chair of the rewards and recognition workgroup, Kitty Neijmeijer.

EYAE also sent a letter to Frank Baaijens to reconsider TU/e not taking part in a national survey on research integrity. Although the executive board hasn’t changed its position, it has put this topic on the agenda.
Appendix
- Advice ‘Strengthening the position of early-career researchers in a changing funding landscape’
- EYAE Advice on attracting and retaining female scientific staff
Strengthening the position of early-career researchers in a changing funding landscape

This document is addressed to the University Consultative Council and Executive Board of the TU/e

The Eindhoven Young Academy of Engineering (EYAE) is a network of young scientists, designers and engineers with a broad interest in science and engineering. All members are early-career to mid-career researchers, possibly in a tenure track, and typically eligible for personal grants at the Veni/Vidi/ERC Stg/ERC Cog level. As young academic researchers we observe a strongly changing funding landscape. On the one hand, there is an increasing stimulus to participate in public-private partnerships. While this has many advantages, e.g., from a research utilization perspective, there are also potential risks. On the other hand, funding for fundamental research has drastically decreased in recent years and is largely dependent on highly competitive personal grants. This is a major concern, since fundamental research substantially contributes to the development of long-term research agendas and high-impact scientific articles.

We therefore feel a need to strengthen the position of, and create maximal opportunities for, early-career researchers, and thereby enhance the research position and impact of the TU/e in general. In this document we provide recommendations to the board and consultative council of the TU/e on how -in our view- the TU/e can maximally benefit from public-private partnerships, while at the same time guard the scientific quality of its research and independence of its researchers. Our recommendations are addressing early-career researchers who are in a tenure track in particular.

Summary of recommendations to the TU/e executive board and consultative council

A. Facilitate new tenure track staff to develop a long-term research agenda with a balanced research portfolio and self-propelled funding through a start-up package. This start-up package will have the following advantages.

1) Allow early-career researchers to directly address their research vision with maximal academic freedom and develop a unique scientific area of expertise.
2) Provide a stepping stone towards a personal grant application. This maximizes opportunities to attract highly competitive personal grants, which clearly enables long-term fundamental research.
3) Provide leverage to engage in public-private partnership projects. With a long-term, well-defined research expertise as the basis early-career researchers can maximize the scientific content of such partnerships while at the same time incorporate new ideas for use-inspired fundamental research.

B. Increase the success of public-private partnerships and their connection to long-term research agendas through training and support

Public-private partnerships are established either bottom-up or top-down. To ensure the success of such partnerships we propose to;

1) Offer training to researchers to establish bilateral agreements, including alignment with their long-term research agenda, negotiation of intellectual property, and contractual aspects.
2) Provide support for researchers to participate in large consortia.
3) Provide an open procedure for participation in top-down programs between the TU/e and partners, and involve researchers in the formulation of the scientific program content.
Introduction
Funding of scientific research in the Netherlands has significantly changed over the last ten years. An analysis of NWO funding (Figure 1) reveals that in 2017 approximately 500 million euro was available for research that does not require any form of matching while almost 1500 million euro is available for research that necessitates matching, either by universities or in most cases companies.\textsuperscript{1} In addition, universities have made significant investments specifically aimed to strengthen public-private partnerships, e.g., the IMPULSE and InSciTe programs at the TU/e. As a consequence, these partnerships contain a substantial part of applied research. In sharp contrast, personal grants provide large freedom and fundamental research.

For the TU/e in particular, public-private partnerships are an important mechanism to appoint new PhD students and therefore a key financial instrument. On average 40-60\% of the PhD projects either involve matching or are fully paid by industrial partners. However, funding of projects varies substantially among the different departments and individual researchers within TU/e. Consequently, a large imbalance between fundamental and applied research between individual researchers may arise.

A discussion between EYAE members from all departments resulted in a number of observations from the perspective of early-career researchers, including the following:
1) a heavy dependence on highly competitive personal grants to develop a long-term research agenda,
2) an increasing pressure on early career researchers to focus on short-term industrial projects,
3) the scientific quality, originality, and depth of public-private projects,
4) lack of guidelines on the initiation and successful execution of bilateral agreements, e.g., joint academic/industrial PhD projects, and
5) difficulty to engage in large consortia within TU/e, and on national or European level.

At the same time, the allocation of projects within the departments is changing due the recent introduction of a PI model at some departments This PI model stimulates smaller research units with on average less projects per unit. Consequently, the diversity of funding instruments per unit may substantially increase. This change has far-reaching consequences for early-career researchers and underlines the timeliness to address the concerns mentioned above.

\textbf{Figure 1: Government contribution for scientific research is increasingly being allocated to projects that require matching from industrial partners.}
A. Facilitate new tenure track staff to develop a long-term research agenda with a balanced research portfolio and self-propelled funding through a start-up package.

The requirements for early-career researchers to successfully complete their tenure track include successful supervision and graduation of at least one PhD student and acquisition of research funding. Hence, a fast acquisition of research funds is essential for the timely graduation of PhD students and the successful completion of the tenure track. There are several options to acquire research funding, including personal grants such as Veni-Vidi-Vici (VVV), ERC, and industrial collaborations. The personal VVV/ERC grants are highly competitive with success rates in the range of 7-14% and an acquisition time of approximately one year. By contrast, public-private partnerships or industrially funded PhD projects generally have a higher success rate and a shorter acquisition time.

Consequently, there is a huge pressure for early-career researchers to engage in short-term public-private partnerships. However, an imbalanced research agenda at the early stage will have major consequences the long-term research impact. In contrast to personal grants, which essentially involve the formulation of a research statement of the researcher, public-private projects have a strongly applied character and do not allow early-career researchers to develop a fundamental research program. However, such a fundamental research program is essential for their development into independent researchers, and for their chances to acquire prestigious personal grants. Moreover, for most early-career researchers the opportunity to do fundamental research is the main reason to pursue an academic career instead of an industrial research position.

Based on the above considerations, we recommend a startup package for newly appointed early career researchers that includes funding for at least one PhD student and material costs. Such a start-up package would 1) allow early-career researchers to directly address their research vision with maximal academic freedom and develop a unique scientific area of expertise and 2) provide a stepping stone towards a personal grant application. This maximizes opportunities to attract highly competitive personal grants, which clearly enables long-term fundamental research. However, given the importance of public-private partnerships, we would also recommend to have a mechanism in place to stimulate new PIs to develop a balanced research portfolio that includes a clear vision on the applicability of their scientific discoveries. This could be in the form of a short document (for instance, 2 pages maximum), which should include the research statement of the PI as well as an analysis of the fundamental and utilization possibilities of their research on different time scales. As a consequence, this will 3) provide leverage to engage in public-private partnership projects. With a long-term, well-defined research expertise as the basis, early career researchers can maximize the scientific content of such partnerships while at the same time incorporate new ideas for use-inspired fundamental research.

Of course, a startup package has a certain financial cost connected to it, yet not implementing a startup package also has consequences, including financial ones. The financial cost of implementing a startup package is rather concrete and directly measurable on a short term, and has an immediate advantage of attracting top scientists. The advantages of implementing a startup package are diffuse and will have major implications on a longer time horizon, and, as outlined above, it may increase tenure-track success rate, increase long-term research impact, high-impact publications and a higher chance in the acquisition of research funds.
B. Increase the success of public-private partnerships and their connection to long-term research agendas through training and support

Early-career researchers at the TU/e are expected to participate in public-private partnerships, initiated either via bottom-up or top-down initiatives. Often, these public-private partnerships are characterized by restrictions on dissemination of scientific knowledge and have a strong applied character. Examples of top-down programs include IMPULSE, InSciTe and e/MTIC which present unique opportunities for the university to collaborate with industrial partners. Moreover, engagement in national and international consortia are key for a successful career in academia.

However, many early-career researchers have been trained in PhD programs with an emphasis on individual research, scientific content, and free dissemination of knowledge. Consequently, early-career researchers often lack the skills and know-how required to initiate and participate in bilateral or multi-lateral public-private programs. In addition, their local network is often still limited which complicates their involvement in larger consortia.

Based on the above considerations we recommend to 1) offer training to staff to establish bilateral agreements. This training should include leading negotiations on the research content including the alignment with the long-term research agenda and the balance between science and utilization. In addition, practical aspects such as IP rights, contracts, and best practices should be explained. At the department level we 2) suggest to provide support for researchers to participate in large national and international consortia. Practically, this could be accomplished by installing program officers with a large (inter)national network who are well aware of both funding opportunities and the research carried out at the department. To improve the scientific content of top-down initiatives we recommend 3) to install a scientific panel consisting of respected scientists from outside the TU/e with a broad view on science. Such a panel should guide the board of the TU/e in deciding on promising future directions. In the implementation phase of these top-down programs, early-career researchers should be involved in the formulation of scientific program content. These measures will result in a balanced research program with ample support by the broad TU/e community.

EYAE Advice on attracting and retaining female scientific staff

Introduction

For many years TU/e has been one of, or the lowest scoring Dutch university in the number of female full professors in the national monitor compiled by the LNVH. In the last ten years TU/e has taken various measures to ensure an increase in female assistant, associate and full professor positions. They have been partly successful, but so far the aims have not been met. As of September 2019 the TU/e board has decided to take a more drastic step. It opened assistant, associate and full professor positions exclusively to female candidates for the first six months of recruitment. The so-called Irene Curie fellowship program is an instrument set up to dramatically increase the recruitment of female talent.

The EYAE understands the ideas behind the policy. To increase the number of female professors at the TU/e it is not enough to recruit women. We also need to retain female staff members by creating a safe and secure working environment. The Irene Curie policy is introduced as one of the most extreme courses of action the TU/e can take to improve the gender balance. The EYAE believes the current policy is too simplistic, and ignores structural issues that may explain the low number of female staff at the TU/e. Addressing these structural factors could very well have a much stronger effect not just on recruitment, but also on retention of female staff, while at the same time making the TU/e more attractive for all early career researchers.

The current explanation for the gender imbalance is strongly focused on implicit bias, but the EYAE believes the huge differences in many departments are too large to be satisfactorily explained solely by this psychological mechanism. The TU/e competes for female talent with other universities, but also with highly attractive jobs outside of academia. Based on a desire for an evidence-based strategy the EYAE recommends to investigate structural factors that could underlie the current gender imbalance at the TU/e.

EYAE has discussed how to increase the number of talented women that aim to pursue a career in science. A working group consisting of Patricia Dankers, Patty Stabile, Ilja Voets, Alex Alvarado, Daniel Lakens and Kevin Verbeek, with additional input from Sofie Haesaert, Oana Druta and Tom de Greef looked into current policies and had a fruitful and informative session with Julma Braat and Corlien van Dam. Based on these conversations we believe that without a better understanding of how to attract and retain women at the TU/e, there is a substantial risk the Irene Curie fellowship will fail in the long run, as the women who are hired now might leave academia after a few years.

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1 Document finalized January 2020
Recommendations

1. Talk to talent

Our first recommendation is to interview young talented female scientists, ranging from master students, PhD-students, to post-docs, with the goal to understand the reasons why they would or would not consider an academic career. This might reveal structural factors of interests in a career in academia and more particular at the TU/e; in this way we might be able to improve our competition for talent with careers outside of science. EYAE also recommends interviewing female staff who leave the university. It has become clear to the EYAE workgroup that we do not have the information we need to determine which roadblocks need to be removed to make sure talent has a successful career at the TU/e. A healthy organization always has people coming in and going out, but by monitoring why female scientific staff decide to leave TU/e we may gain valuable insights into the structural factors that hamper retaining female scientific staff and that hamper female staff from becoming full professors.

2. Investigate how the TU/e can become more attractive for talent

Informal conversations we have had reveal that young talented scholars make quite deliberate trade-offs between a career in academia or in a company. In these trade-offs, the sacrifices that are perceived to be needed in the work hours required to excel, the relatively long uncertainty tenure (including e.g. the time it takes to get a contract that will get you a mortgage at a bank), expectations about gaining work experience abroad, time spent on securing grants, travel, the high work pressure, and the lack of teamwork are relatively unattractive compared to equally exciting jobs in companies. We believe the signals that we have received so far warrant a more representative investigation. It is possible that getting a permanent contract after one year in a company (which is often required to be able to buy a house for a young family), or having no requirements to uproot their social life by moving abroad at a time they might consider having children, leads talented women (and men) to decide against pursuing a career in academia.

Although the final recommendations should be based on interviews with a more representative sample of researchers at the TU/e, we offer the following recommendations:

a. EYAE recommends to critically evaluate the extent to which job insecurity is deemed unattractive, and whether offering tenure more quickly (e.g. after 1-year) makes a university career more attractive.

b. EYAE recommends to clearly communicate that a stay abroad is not required for a successful career at the TU/e, and alternative solutions to building a network are perfectly acceptable at our university.

c. Develop a plan to engage young highly talented female researchers (at PhD student level) in an academic career. Coach these highly talented researchers and explain the possibilities.

d. Examine and, where possible, accommodate different wishes for structural support. This could range from free childcare at the TU/e, programs that hire academic couples or that help partners to find a job in the Brainport area, cover travel expenses for a partner who accompanies the researcher when travelling to conferences to take care of young children (‘Nanny fund’), or any other topic that talented young scholars raise.

e. Explicitly examine how the ‘rewards and recognition’ program can lead to changes that make the university a more attractive place to work. Depending on the feedback from interviews of talented women who leave the university, or talented PhD students who choose not to pursue a career in science, how can ‘rewards and recognition’ be aligned with what motivates talent (e.g. rewarding team work).