

Executive Board

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Position of the Executive Board of Eindhoven University of Technology regarding the assessment of the department Electrical Engineering

In December 2017 an international review committee assessed the research in Electrical Engineering of the period 2011-2016 at Delft University of Technology, Eindhoven University of Technology and the University of Twente. The committee assessed the quality and relevance of research conducted in the period 2011-2016, the viability, and the quality of the research training, research integrity and diversity. The assessment was carried out using the Standard Evaluation Protocol 2015-2021 for the research assessment of public organizations in the Netherlands.

The assessment committee consisted of:

- **Prof.dr.ir. Patrick Dewilde**, Committee Chair, Emeritus Director of the TUM Institute for Advanced Study.
- **Prof.dr.ir. Piet Demeester**, Professor of Communication Networks, Ghent University-imec, Belgium.
- **Prof.dr.ir. Rik De Doncker**, Director of Institute for Power Electronics and Electrical Drives (ISEA) and the E.ON Energy Research Center, RWTH Aachen University, Germany
- **Prof.dr.ir. Heikki Koivo**, Emeritus Professor of the Department of Electrical Engineering and Automation, Aalto University, Finland.
- **Prof.dr.ir. Robert (Bob) Puers**, Professor of Microelectronics and Sensors, KU Leuven, Belgium.
- **Prof.dr.ir. Dominique Schreurs**, Professor of Microwave Engineering, KU Leuven, Belgium.
- **Dr. ir. Leo Warmerdam**, patent strategist at NXP Semiconductors, the Netherlands.

The committee concluded:

The scientific output shows a very good overall performance, with several peaks of excellence. EE at TU/e has shown impressive performance in a number of top areas, many groups and senior scientists have sturdy international reputations, as evidenced by top publications, important rewards and international recognition.

The committee delivered an extensive analysis of the domain of electrical engineering in The Netherlands and provided many general and more specific recommendations. Some of the recommendations for TU/e are listed below.

- *A clear formulation of research challenges and technological issues connected to the chosen themes and implemented by the Centres would enhance the visibility of the research and provide interest in cooperation by industrial partners as well as motivation for financing by public and private authorities.*

Date
April 2018

Page
2 of 4

- *In a similar vein, an inventory of the need for knowledge in EE, attuned to the Eindhoven area would be helpful in further focussing the strategic choices of the Faculty (both directed to research and education).*

Relevance to society

- *The Committee recommends to make the TU/e technological assets and competences more visible e.g., on the internet. A good example for this is the Energy Landscape data base from the Jülich-Aachen-Research-Alliance (JARA);*
- *Concerning facilitation of spin-offs and patents: the Committee advises to put a strategy in place to assist the creation of spin-offs and to provide means towards implementation (e.g., innovation scouting, allowing resident entrepreneurial scientists or patent filings with the Innovation Lab, aiming at valorisation through spin-off).*

Viability

- *The Centres are an eminent place to make the research goals of the Domain clear and visible both internally, for motivation, and to the outside world for attracting interest and funds. The Centres are advised to collect and define the research goals, make them visible on the internet and provide effective means of access;*
- *[For the three Domains] The Committee advises the Domain to compare its choices of research topics, scientific challenges, and organisation with major other players in the field (e.g., MIT, Stanford, KU Leuven, RWTH, ...) and how other major scientific domains address their environment, e.g., visibility (astronomy, medicine, physics, chemistry, ...). The Committee does not advice to necessarily copy these, but knowing what the competition is up to is valuable information, both for focussing one's own choices and for not missing out on important developments in knowledge and expertise;*
- *The position of large facilities like Nanolab@TU/e and (in the future) PITC and their relation to the Faculty is from various points of view a critical issue. It may drain the resources of the Faculty considerably, or else the facilities might lead a subcritical existence when not properly funded. The Committee recommends the Domain to further develop a viable policy on this issue, also in view of potential further initiatives towards the creation of new laboratories. Recognition of the facilities for photonic integration as a major international Centre of Excellence should help to alleviate the financial burden on TU/e and ensure a sufficient level of financial support by public authorities in the future.*

Future Strategy

The outreach of TU/e Faculty to industry is excellent. EE benefits from a powerful local eco- system. Additionally, the Committee also considers the willingness to collaborate and align on programmes as essential.

The Committee recommends to strengthen the vision on the future of the Faculty on a number of items:

- *The role of Centres and Themes;*
- *The formulation of central scientific challenges and research questions to be addressed;*
- *The development of the future knowledge position the Domain and its research groups is striving to achieve.*

Funding

The consolidation of funding in the 2nd and 3rd money streams will remain a key challenge. The Committee recommends to strive for better visibility, and more intense political work from the faculty leadership (this is no criticism, it is a necessity).

Leadership

TU/e shows very strong international leadership in several specific areas with a major effort in Photonics. The Committee learned from the visits of the research groups that the four criteria on which staff is assessed is sometimes felt as unclear, because the targets are not clearly set, and this causes stress for staff in tenure track positions. The Committee advises to set more concrete targets for the staff promotion criteria.

Staff

Finding highly qualified researchers remains a problem. The TU/e permanent staff in EE is largely Dutch. The Committee advises the Domain to tap the international market more intensely. This strategy may increase both the junior-to-senior and the female-to-male staff ratios (not to talk about the international ratings).

To capitalize on this pool of talent, the Domains should (1) offer attractive conditions both in terms of local embedding and remuneration, (2) assist in the transition to the Netherlands much better than they are doing at present, (3) exploit the international contacts and resources of the top research groups to scout for excellent new staff members, and (4) offer a starting package for a junior professor (e.g., offer them funding for 2 PhD students and a Post Doc for 5 years).

Facilities

EE has great facilities, at least the ones the Committee visited in their new building. The new building, with its open space, encourages cooperation between the different groups. It is recommendable to make these facilities more visible on the TU/e webpages, as it would attract more students and young staff.

PHD and graduate school

- *Find the root causes for the large drop-out rate and decide what to do about it;*
- *The ratio of PhD candidates graduating in less than five years' time is much too low. Stringent action (e.g., closer control on progress, better assistance in writing and publishing skills) is necessary. Thesis advisors may also be pushing for more results at the cost of thesis production. This tendency, if it occurs, should not be tolerated, as it is detrimental to the PhD-candidate, who already enters the job market at a relatively advanced age.*

Integrity

The Committee recommends:

- *To define, adopt and enforce a policy concerning the acquisition of 3rd money stream projects as far as their content is concerned and the right and duties of its staff;*
- *Similarly concerning IP;*
- *To adopt the IEEE rules concerning authorship of publications.*

Diversity

- *See our recommendation concerning international hiring, where a much larger pool of potential top level female candidates is available. Hiring*

Date
April 2018

Page
4 of 4

internationally would also increase the overall international diversity of the Domain;

- *The visibility of societal goals, areas of expertise and important research questions may improve the visibility of the Domain for aspiring young students and thus improve the diversity in the (graduate) student population*

The Executive Board highly appreciates the work of the committee and the recognition of the quality of the research of TU/e's department EE. It is equally appreciative of the many concrete recommendations of the committee and the thorough analysis of the domain of Electrical Engineering in the Netherlands. The Executive Board has discussed the recommendations with the Department Board and has asked the department to make a plan for following up on the assessment.

The Executive Board of TU/e has accepted the report and its recommendations and wishes to thank the assessment committee for the considerable time and effort it has spent on this assessment.

On behalf of the Executive Board,

A handwritten signature in blue ink, consisting of a stylized 'F' and 'B' followed by a long horizontal line that ends in a small flourish.

Prof.dr.ir F.P.T. Baaijens
Rector Magnificus Eindhoven University of Technology