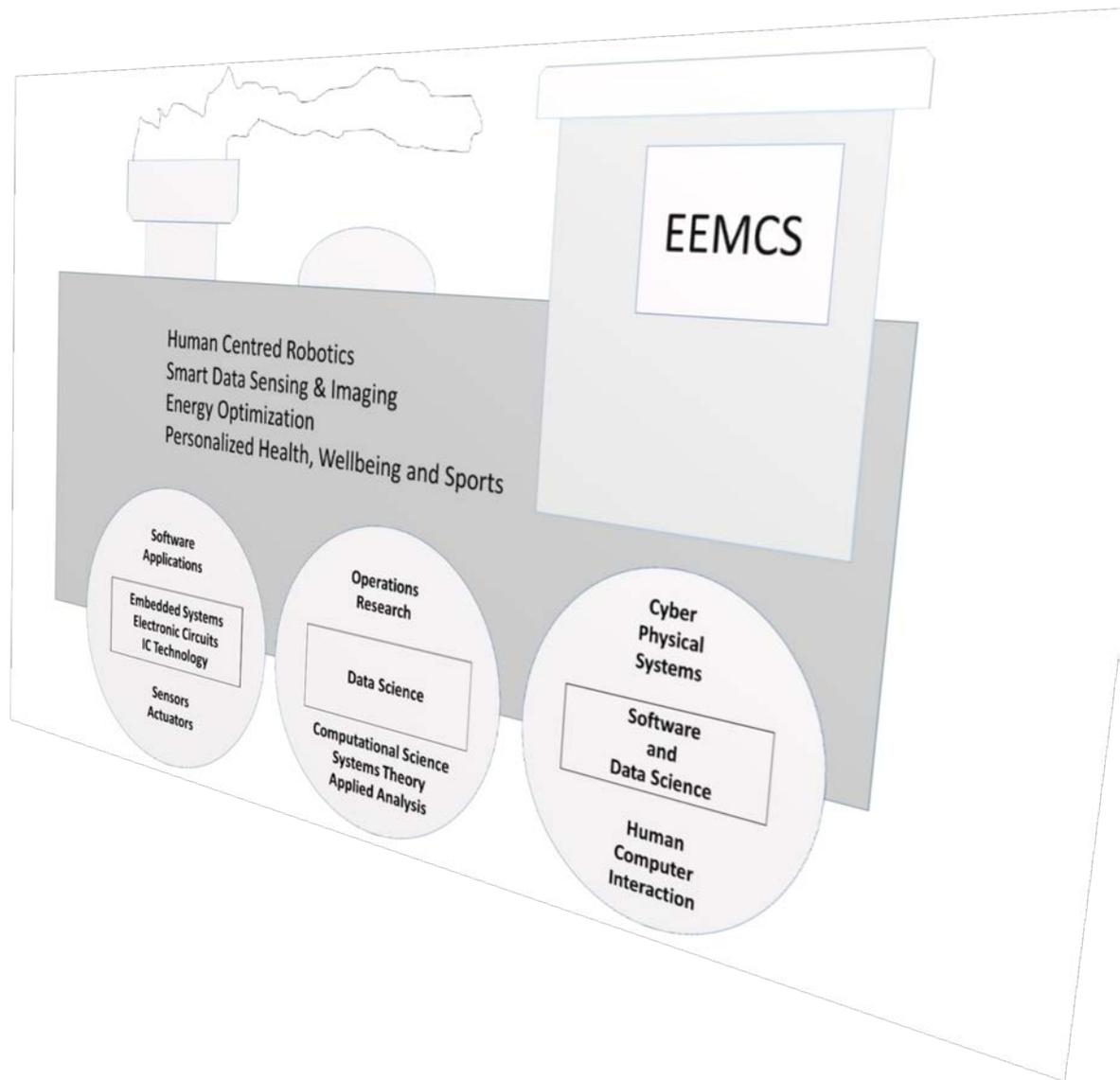


# EEMCS Annual Plan 2019

(kenmerk EW18/B:mhs/915/tnc)



## Management Summary:

After completing two reorganizations in the last years the faculty EEMCS is now doing well. Our student population has doubled in five years and our PhD output remains high, leading to a solid 1GS funding. Our project portfolio grows and will grow in the coming years in line with our ambitions.

The opportunities for further growth seem to all add up this year, coming from industry, regional, national and European governments, both for teaching, fundamental research and projects. The extent to which we will be able to seize these new opportunities will depend on three challenges.

The first challenge is to hire qualified staff, mainly academic staff. This is needed not only for expansion, but also for replacing staff that retires and staff that continuously work elsewhere. Our estimation is that we might need to hire at least 25 full-time permanent staff in 2019 for expansion only, not taking into account the large amount of project staff for temporary positions and projects.

A second challenge is that we need to grow sustainably, meaning that we need to maintain the right balance of both expertise areas and academic activities inside our faculty and in relation to the UT faculties and programs. More concretely, this means that our multi-annual strategy and our domain plan need to be renewed and that teaching programs need to be aligned.

The third challenge is that we need to host all the new students, staff and projects. Already now we are facing a shortcoming and we foresee worse in the coming years. One of the reasons is that also the faculty S&T, with whom we are sharing space in Carre and Meander, will also substantially expand its activities. Besides that, Citadel will be rebuilt and Techmed will only move to its new location next year.

So 2019 and onwards will be very dynamic and full of positive challenges for us. The activities formulated in this plan are an overview of how we want to approach them, acknowledging that we will also need to be flexible. We as a faculty and in particular the board will also need support for managing the agenda, monitoring and reporting progress and supporting our groups. For this reason, together with the other faculties, we jointly claim KE200 (KE40 per faculty) for a period of four years, to be spent on faculty board support. This support will be aimed at topics that we as faculties have in common in the area of education, research or project acquisition. In the first quarter of 2019 we will jointly propose on how to spend this budget.

## Developing global citizens

### Long term strategic goals

EEMCS continues to educate the professional of the future in an international context. Our aim is to provide well appreciated bachelor and master education to a sufficiently large student population strongly related to the areas of research in which we excel and well connected to the current and future needs of society. Furthermore, it is our ambition to develop into a truly international and intercultural community. Our goal is to provide students the appropriate experience that will prepare them for an international career and to enhance the possibilities to attract international staff. Active participation in our international network of (academic) partners is indispensable for that. We are making strong progress in achieving these long-term goals and will continue to do so in 2019.

### Five priorities in 2019

#### 1. UTeachers'Academy@EWI

We constantly strive for optimal performance in teaching. Therefore, the pilot program "Excellent Teacher Practitioner" will get a follow up in the form of the "UTwente Teachers' Academy@EWI", which will be a network of excellent teachers where pilots are discussed and carried out and where best practices are exchanged. We will build the network by selecting EWI teachers who improve their performance based on knowledge, experiences elsewhere and input from colleagues. Members get the opportunity to execute pilot studies and to discuss the outcomes with colleagues. In this way, the faculty wants to improve the quality of teaching, and to be prepared for the international Classroom. This priority is in line with the quality agreement program of UT. The required budget for this activity is estimated 40k€/year for 5 pilots, professional support and organization. Involvement of HR and CELT is needed.

#### 2. Quality assurance in an international context

The quality assurance at the master level is not yet at the desired level. This academic year (2018-19) we will introduce the evaluation of the master courses on an individual basis. A detailed plan will be written, where we will make use of the experience at Technical Medicine. It is our intention to optimize the contact between the teacher and the students, and to have a scenario for implementing adjustments based on student evaluations.

We will make a start monitoring the ECA qualifications for internationalization benefiting from the experience of the faculty ITC. This will be a major effort for most of our bachelor/master programs. We intend to achieve that the curricula of the bachelor's programmes pay ample attention to the development of intercultural competences and provide specific international experiences. The corresponding learning goals are reflected by the Programme Intended Learning Goals of the BSc programmes

This priority is in line with the quality agreement program of UT and helps us to prepare for the so-called "Instellingstoets". To realize this, we need will allocate 1fte extra on quality assurance and internationalization, to support the program managers. Collegial support from Technical Medicine and ITC is needed. CELT and S&B are invited to assist.

#### 3. Multidisciplinary master programs

We aim to develop new multidisciplinary master programs that align with the ambition of the four research goals of the faculty. In this academic year, we start with the master in Data Science, embedded in the three individual disciplines. We will investigate the possibility to start a Data Science Lab in Twente. Such a lab allows students, graduates and postdocs to work part time for different organizations on exciting projects, supervised and managed by our data science researchers.

Furthermore, there is the wish to start with a master program in Robotics. We will investigate the scope of this master together with ET and we are aiming for a start in the academic year 2019-2020. The just renewed license for the Master Systems and Control might be a good umbrella for this initiative.

We will investigate the possibility of a master track in which Data Science is linked to movement in a broad sense, ranging from movement disorders to sports. We envision a joint program with ET in this direction with also input from RRD. Finally, we intend to intensify our participation in the EIT Digital Master School by setting up an online semester in Cyber Security and participating in the master Data Science. For this purpose, we have already enlarged our EIT coordination capacity (40k€/year).

The abovementioned activities are in line with the Quality Agreement program of UT. For the Data Science Lab we foresee 50k€ as starting grant. After two years it should operate cost-neutral. The master program in Robotics will require 50k€ pre-investment and support from M&C and S&B. Finally, collegial support and participation from ET is needed.

#### 4. Digitalization: Blended learning and digital examination

Digitalization is important for making our programmes future proof. The 4TU-AMI program on blended learning is well on its way and will run for two more years. The resulting digital environment will be made available for all our students. We will further invest in the development of digital testing, as this is a useful tool to keep the effort for examination manageable. Technical support for using ICT in our programmes will be enlarged.

We expect a need for investing 0.5 fte in digital testing and support apart from LISA and CELT support.

#### 5. WVS budget

The WVS budget plan for 2019 will be drawn up after consultation of the PC's, the programme directors, the study associations and the faculty council. We will reserve budget for "UTeachers'Academy@EWI", quality assurance in an international context, the data science lab and digitalization..

### Reflection on KPI's

The EEMCS 'global citizens' KPI's and our comments have been attached to this annual plan. In 2019 we expect again to serve more bachelor and master students. Our challenge is to consolidate also the increasing student appreciation. The international proportion is expected to grow both in bachelor (30%) and master (35%). Bachelor influx into EEMCS master requires our attention. Currently 70% of our bachelor graduates stay at UT. 60% of which stay at EEMCS. The new master ITech and our plans for new master tracks will improve the attractiveness for our bachelor graduates and for new master students. In general we need better tooling an information with respect to the origin, study success, conversion and labour market situation of our students and alumni.

The persistent growth of our student population is reflected by the trend in our staff/students ratio. EEMCS compares well to the other faculties, but if we take service education into account, the conclusion is that EEMCS ratio (20) is 10% higher than the other faculties (18). Together with a highly diversified portfolio of programmes this explains the high teaching workload in our faculty and the need for investment in recruiting and retaining staff, both academic and support.

## Making a real impact

### Long term strategic goal

Cross disciplinary research based on disciplinary strengths is the core of our strategy. Showcasing impact not only by publishing but also by proper research communication, setting up field labs and stimulating IP transfer is key to our success. In doing so we want to apply the principles of good research by stimulation of open science as much as possible and adherence to the prevailing privacy, integrity and data management guidelines.

### Five priorities in 2019

The following initiatives are scheduled for 2019 in order to further strengthen our research:

#### 1. Investing in fundamental research

We will continue to invest in our disciplines. In 2019 we expect to benefit from the "Sectorplannen" for all three disciplines (EE, AM and CS) with a magnitude of opening at least 9 tenure-track positions plus 9 AIO's positions in total. Currently our disciplines are drafting proposals for this which we be aligned both on faculty and interfaculty level. Through this additional research capacity, we expect to be able to grow the number of successful personal grant applications. Peter Apers supports us in positioning our themes and areas of expertise in the CS Sectorbeeld. At this moment, plans are being written. For Electrical Engineering we expect investments in (1) Communication and signal processing, (2) Electronic devices, circuits and systems and (3) Electrical Energy, for Computer Science in (1) Human-Machine Interaction & Cognition, (2) Software- and Information Systems, including Algorithms and Theory and (3) Security and Privacy and for Mathematics in (1) Operations Research, (2) Statistical Data Science and (3) System Analysis and Computational Science.

## 2. Investing in cross-disciplinary research themes

For cross disciplinary research we will emphasize the following four themes (1) human-centred robotics , (2) smart sensing and modeling, (3) energy optimization, (4) personalized health, wellbeing & sports. Proposals for attracting substantial national and international research funds have been formulated and for some of them they have been already granted (e.g. Robotics). Support from the institutes is expected both for project acquisition and for project management capacity once we are successful.

## 3. Data Science

We will strengthen our capacity in data science by investing in Data Modelling and Analysis, E-science and Machine Learning and Artificial Intelligence. Important application areas are Smart Industry, Health, Wellbeing & Sports. Next, together with DSI, we will invest in (research on) digital research infrastructure needed for the different research programmes in Data Science and beyond. In line with this ambition we are participating in a formal consortium on Data Management & Science with Astron, Radboud University and German partners like Humboldt University and Fraunhofer.

## 4. Connection with external partners

We aim to stimulate impact and connect more with external partners amongst others by the creation of physical research labs and meeting places both inside and outside our campus (modern university). Examples are Digital Soccer Field Lab on campus (in cooperation with SCISports and the Sport Data Valley), Energy Innovation Hubs in Overijssel and an Industrial Software and Security Lab in Apeldoorn. Our connection with Germany will become even more important through initiatives with Uni Münster (data science), Fraunhofer (smart industry), Uni Bundeswehr (security).

Our partnerships with companies and governments will continue to expand, each containing a portfolio of research and education activities. Examples include already Nedap, ING, Bronckhorst, Hospitals and the Ministries of Defense and Justice. Our experience is that the availability of legal support for designing the right contracts for these activities needs to be increased.

## 5. Research Quality

In order to guarantee good research practices and research quality, we will further formulate and implement our policy with respect to research data management, privacy, ethics, open science and research integrity. For this intend to hire extra capacity (data expert / PCP) and will we need support from LISA and research policy experts. Finally, the dynamic developments in our research agenda requires un updated "Domeinplan". Our efforts in digital research infrastructures (also as a topic of research) also aim at improving research quality.

## Reflection on KPI's

The EEMCS 'impact' KPI's and our comments have been attached to this annual plan. Our staff works hard to increase its research portfolio. Despite the constantly increasing education workload we are successful in that. Our research portfolio in 2019 is expected again to grow compared to the year before, approaching the volume targets that we have formulated. Acknowledging that our academic staff performs well and comparable to the other faculties in terms of PhD supervision and external funding acquisition, staff volume (personnel planning) and effective project acquisition are key factors for further growth. Support from the INS is therefore crucial.

The PhD influx reflects the trend in our research portfolio. we expect a growth again in the next few years. We see good opportunities for increasing the number of PDEngs in our network with private partners.

## Stimulating an entrepreneurial mindset & behavior

Stimulating and supporting entrepreneurship is on the EEMCS agenda. Departments, groups and staff members are given maximum freedom to make their work successful. In line with our vision 'Cross disciplinary research based on disciplinary strengths' more responsibilities are being transferred to our departments and the visibility of their profiles will be increased. Alignment of faculty and department ambitions are guaranteed by involving the department heads in the periodic EEMCS Faculty Board+ meetings. .

In order to enable the departments to take more responsibility, their support and management information needs to be improved. amongst others this concerns:

- financial steering information (e.g. through sharepoint)
- personnel steering information (e.g. through SPP and 9 grid assessments)
- KPI monitoring

Next to this, in order to stimulate entrepreneurship we emphasize the availability of support like:.

- Project coordination (extra capacity in consultation with INS)
- Education Module administration (extra capacity)
- Recruitment & Admission analysis
- Small research innovation funds (SEO for project acquisition and grant application)
- Support and training for personal grant applications: talent management

Further improvement of research support is depending on the future positioning of Strategic Business Development and the Zakelijk Directeuren. In any case we intend to hire expertise for supporting collaboration with private sector partners, such as Nedap, ING and Hospitals in general and our PDEng programs specifically. We will also reserve a small budget connected to our talent management activities.

### Reflection on KPI's

The KPI's connected to entrepreneurship are discussed in section 2 (IP, collaboration), section 1 (internationalisation) and section 4 (staff, language policy / use of English).

## Experimenting, pioneering, innovating & Campus

### Long term strategic goal

Our ambition is to guarantee an environment for staff, students and partners which supports them in realising their professional and personal goals.

### Five priorities in 2019

#### 1. Infrastructure

We expect a need to further invest in facilities for our students and staff. In particular this concerns home bases for the larger student numbers and room for study. In 2019 we foresee that the WELP-zaal will be relocated from Zilverling to Carre, creating additional room for students and study associations in Zilverling. For this we depend on the planning of TECHMED and on the support from Facility Management.

Next, the research expansion of Electrical Engineering, in particular RAM and BIOS, leads to additional demand for staff room and labs in Carre. We need to align this with S&T faculty and we need help from Facility Management to create an overall planning. Furthermore, we anticipate the idea with respect to creating a common UT Robotics Lab. With respect to Sport and Data, together with SciSports we are installing movement measurement and analysis system on one of the UT sports fields on campus. It is our intention also set up an attached showcase facility for using and demonstrating the system and related UT activities, possibly combining this with other data-based initiatives (e.g. e-sports).

## 2. Personnel: staffing, recruitment and workload management

In 2019 we continue to update and execute our personnel agenda. Our plans with respect to workload management and English language as formulated in 2018 will be further implemented. By the end of 2018 we have created a mid-term personnel overview (both quantity and quality) for the different sections of EEMCS using 9-grid and SPP tooling. This medium-term personnel planning will be incorporated in our multi-annual budget. A specific challenge for EEMCS is to recruit sufficient qualified young staff taking into account our diversity ambitions and to retain them. This staff is needed for dealing with the increasing workload (expansion of education and research) and for replacing retiring staff. In 2019 we will execute our personnel planning, monitor progress and make adjustments based on the quarterly management reports.

## 3. Finance: project portfolio and capacity budgeting

In line with UT ambitions, project portfolio monitoring and management will be further emphasized in 2019. We will set up a system for monitoring project application and intensify financial coaching of our research groups. A specific challenge is our hosting of the DIH-HERO project. For this Cascade funding project we are developing a management and support system together with DSI, TechMed and EU-Office. With respect to capacity planning we will continue to stimulate and support the EEMCS disciplines in taking charge of their domain. We will incorporate the conclusions of the capacity budgeting discussion that is scheduled in the second half of 2018.

## 4. Internationalisation & Language policy

EEMCS fully adheres to the international ambitions. In addition to what already has been stated in section 1, in 2019 our foreign partnerships will be intensified both in Europe (e.g. EIT) and outside Europe (e.g. China) enabling both improved recruitment and mobility. Admission will be further improved and our scholarship plans will be adjusted based on the analysis of recent recruitment efforts. We might emphasize EU more.

The language policy implementation plan that we will develop in 2018 will come into effect in 2019. The support that we expect from UT service departments and others will be detailed in the plan.

## 5. Faculty Governance

In the end of 2018 we intend to evaluate the EEMCS governance. This concerns not only the division of tasks among board members, but also the position of the (chairmen of the) disciplines, their support and the overall interaction in the faculty. The results of this evaluation will be implemented in 2019.

### Reflection on KPI's

The EEMCS 'experimenting' KPI's and our comments have been attached to this annual plan. In 2019 we expect to increase the percentage of BKO certified staff. We must however realise that due to frequent changes in staff a fair proportion of our staff will be "in process of obtaining BKO".

For hiring new staff we are increasingly dependent on foreign influx. We therefore foresee that the percentage of foreign staff will increase in the coming years.

## Specific faculty goals for 2019

Two major challenges of the UT are the formulation of the UT Vision 2030 and the formulation and execution of institution wide research programs supported by our institutes. With respect to the first it is expected that digitalization will have a huge and decisive impact on our university and our activities. EEMCS wants to support the UT in assessing this impact and incorporating its consequences in UT vision 2030.

With respect to the institution wide research programs, we see that the role of the INS still needs to evolve. This is both a challenge for the faculty boards and for the INS. EEMCS wants the INS to be successful and will assist in particular DSI in evolving towards an university wide program in which all faculties participate and feel welcome.