

NORDIC FIVE TECH

Annual Report 2018 – 2019



THE ANNUAL REPORT 2018-19

gives an update on the N5T collaboration on education, research, innovation and industry relations, communication and organization.

At the Presidents' meeting in May 2018, Aalto took over the chairmanship of the Nordic Five Tech. This included a mandate from partners DTU, Chalmers, KTH and NTNU to follow up on the strategy and vision of the alliance, which is to become a Nordic check-point for international MSc students by offering unique master programs, to create an extended campus for staff and students and to attract EU funding for excellent research and to create societal impact.

Summary of the new initiatives

As a response to the current situation where online learning and blended learning are widely recognized as opportunities for improving higher education all over the world, N5T decided to establish a task force on **e-learning**. The task force has a mandate to explore best practices at N5T partner universities, both in developing online learning resources as well as applying them in different pedagogical contexts. The overall goal is to improve the learning experience of our students. N5T is committed to ensuring high quality education and to expanding educational opportunities for an increasingly heterogeneous student population. The group has focused on mapping the activities at the different universities. This has given promising hints of short-term mobility, development of joint courses and general exchange of good practice.

Shared infrastructure - in order for N5T to take full advantage of the strategic infrastructure within the alliance's key research areas, the presidents decided to set up a start-up group composed of infrastructure managers and senior research staff responsible for infrastructure. This task force started work by surveying the key infrastructures and infrastructure governance at each partners and identifying a framework for infrastructure sharing.

The presidents also agreed to draft **two joint statements, one on life-long learning and one on engineering education resources** to influence decision makers in the respective Nordic countries. Joint statements were published in the www.nordicfivetech.org

As a first step to improve the marketing of N5T joint master programs, an external consultant was engaged to conduct a study **to map the motives of technology students when choosing the N5T master programmes**. The report indicates that the good reputation of Nordic education is one of the decisive factors for students to choose N5T.

During the presidency year, all **N5T working groups, networks, start-ups and task forces completed a self-evaluation exercise**. In general the work progressed very well. Some groups indicated a desire to obtain central N5T funding for activities and travel, some reported about the missing members, and some indicated difficulties in finding enough time for N5T activities on top of their daily assignments. The N5T committee was thankful to the excellence efforts of all groups while confirming that N5T does not have a central budget. All activities are locally funded by the respective university based on principals established by the presidents. Based on the self-evaluation, some group mandates are revised and the N5T organization chart has been updated.

Cover Photo: Cold Climate Engineering Master Program –team during the AIC 2018 Conference in Greenland.



Nordic Five Tech presidents, committee and secretariat members in front of the new VÄRE-building at Aalto University's Otaniemi Campus in May 2019.

EDUCATION

Joint Master Programs

The joint master programs are important trademarks of the N5T as well as platforms for wider academic collaboration. In order to ensure high quality in the implementation and running of the programs, the alliance has produced a range of guidelines, templates and materials. In 2019, the Handbook for Program Coordinators was successfully updated. Under the leadership of DTU, all universities contributed to this new and more compact Handbook.

Admission Days

The focus on the Admission Days 2019 continued from the previous year's topic '*How to enhance external and local communication of the programs*'. The N5T Admission Days took place at Chalmers in March 2019 and gathered all program boards on one campus, to discuss common issues, challenges and positive experiences as well as to review applications of students to the programs. During the joint meeting between the Admission Days participants and Committee and Secretariat members '*A baseline Study on motives of Tech students when choosing a Master program*' was introduced to the audience. Subsequent discussion brought additional light into the topic and the report, compiled by Oxford Research, was finalized in April. The Committee meeting took place alongside the event.

Student activities by Programs

The master programs organized several student events during the year. Innovative Sustainable Energy Engineering winter school was organized at KTH while a NMME and Cold Climate weekend was held at Aalto.



Polymer weekend took place at Chalmers in April 2019.

N5T Students at Aalto in October 2018 during the pizza lunch.

Revised evaluation process for N5T JMPs in future agreement

The Committee decided that in the next agreement periods, JMPs would not be asked to submit yearly reports other than that required for the annual report. Programme boards will continue to complete self-evaluations of the programme one calendar year before expiration of the consortium agreement.

During the reporting year, the **Innovative Sustainable Energy Engineering (ISEE)** carried out a comprehensive evaluation and formulated a strategic plan.

Bachelor of Engineering Exchange

The NTNU lead group has continued planning the work after the initial workshop. They have established contacts between the teachers on the Bachelor of Engineering at N5T partner universities. The group continues work to develop the "contracts" for student exchange between the N5T partners. The group will hold a workshop on Student Exchange on Bachelor of Engineering N5T in Ålesund on May 7-8. Progress will be assessed at the workshop and the working-group may be expanded to include more members from all the relevant N5T partners. As a next step, the group will identify study programs that can serve as pilots for this initiative and to create a framework for the exchange in cooperation with international coordinators.

Entrepreneurship Education

NTNU took lead in this working group. The group meets once or twice a year with the primary objective of

knowledge sharing and learning best practices from other Nordic universities. Additional goals are to find cooperation possibilities and synergies in the area of entrepreneurship and innovation education and acceleration. During a meeting at Aalto in March 2019, the group worked on defining its mandate and drafting common goals.

The group sees numerous possibilities of increasing the cooperation amongst the member universities and are currently seeking options for funding and implementation of short-term student mobility, staff and faculty trainings.



Entrepreneurship Education working group met at Aalto in March 2019.

Quality Assurance - Peer Evaluation

In 2018, the five-year MSc programme in Communication Technology at NTNU was peer-evaluated. Other evaluations were on hold since several group members were engaged in national exercises and the recruitment of new members to the group was in progress.

Student “extended campus” activities

The Student Unions have met twice during the 2018-19. The meetings are used to exchange knowledge and experiences, to better accommodate the students that follow N5T study programs. This is important in working towards a smoother transition between the universities, both academically and socially.

Pedagogical Collaboration

During this reporting period the pedagogical collaboration network started by identifying new group members and representatives from each N5T university. The first face-to-face meeting with all new members took place at DTU in April 2018 with a purpose of setting up the aims for the group and action plan for future activities.

The group developed clear aims and defined several actions. The main objective is to offer networking possibilities and support for pedagogical developers at the N5T universities and to identify program director / leader needs with the aim of providing better support. The group also seeks to identify areas suitable for creating and supporting communities of practices for program leaders, to identify needs of the pedagogical units and to establish further cooperation in focused areas.

A seminar for pedagogical leaders on the topic '*Leaders on top of the e-learning revolution*' was identified and will be planned in cooperation with the e-learning group.

Continuing Education

The working group has worked on exchange of knowledge and experience on life long learning, organization and administrative matters, strategies, business models, best practice, preparedness for pitfalls, incentives for scientific staff and more. Mapping of the activities at each of the universities is underway.

Committee proposed the group to adopt a new name – Life Long Learning.

RESEARCH, INNOVATION AND INDUSTRY RELATIONS

Doctoral Collaboration

This group continues to share experiences on quality assurance systems and on the use of digital systems for the administration of the doctoral education. As a future project, the group will map incentives, possible obstacles and enhancement mechanisms towards stronger cooperation in doctoral education within the N5T.

The joint N5T doctoral course database constitutes a strong instrument for facilitating collaboration among the partners. As of April 2019, the course database contains 774 courses:

| N5T PARTNER | No. of courses in 2018 and 2019 | |
|-------------|---------------------------------|-----|
| Aalto | 66 | 83 |
| Chalmers | 32 | 31 |
| NTNU | 368 | 368 |
| KTH | 174 | 174 |
| DTU | 150 | 118 |

Shared Infrastructure

N5T is committed to take advantage of the N5T extended campus in terms of network activities, research infrastructure and academic competence. The idea of utilizing the cumulative base of research apparatus is a pillar of the N5T Charter. Presidents took a decision in 2018 to establish a start-up group composed of research staff responsible for infrastructure to review how strategically relevant infrastructure can be employed for the alliance's key research areas. Chalmers took lead in this start-up with an aim to identify a thematic framework for the mode of operation.

Research infrastructure (RI) is a complex field and several issues need consideration. Differences in national laws and regulations, funding and pricing schemes and institutional policies and practices need to be considered when considering shared research infrastructure. Currently there is virtually no Nordic co-ordination or even information sharing with respect to investments or availability of RI. Some of these issues must be addressed on the political level, whereas others can be alleviated by administrative measures and concrete actions. The task force intends to give advice and recommendations on both levels.

DTU initiated specific N5T collaboration for RI in the field of civil and mechanical engineering in autumn 2018. RI directors and academic leaders at the N5T universities were invited to workshop. A second follow-up workshop was held at KTH in February 2019, and a third workshop is planned at Aalto later in 2019. Conclusions regarding how to set up collaboration, issues and obstacles observed (and solved) within this pilot case will be an important for further work in other research areas.

The group has identified activities for further work long-term to develop tools and mechanisms, to share RI, to find practical solutions to identified problems and barriers, and harmonize practices as far as possible among member institutions. Results so far within the collaboration of RI in the civil and mechanical engineering includes a shared PhD course for experimental uncertainties relevant for measurements in mechanical engineering systems, better understanding of lab equipment at the five N5T universities and mobility of PhD students.



CASMaT / infrastructure workshop at DTU in November 2018

Strategic Collaboration on EU Proposals

The group is collaborating in order to attract more EU funding to N5T partners by strengthening researchers' possibilities in winning Horizon 2020 bids and by facilitating collaborative links between the N5T institutions. In the past year, the WG has mapped the research areas among the five universities and identified topics of common interest. During the reporting period the group has had ten Skype meetings and two face-to-face meeting.

The group considers the main achievement to be the development of the action plan to facilitate networking and joint proposals amongst the N5T researchers. The group plans to deliver at least one N5T Horizon 2020 workshop per year. The workshops will address Horizon 2020 collaborative research topics of common interest. The group will continue to explore further opportunities for collaboration e.g. around MSCA and NordForsk funding.

The group aims to develop a joint support package for N5T research groups who as a result from the Workshop want to apply for EU funding. This was piloted in autumn 2018. The group will tentatively prepare for N5T collaboration in the coming EU framework program Horizon Europe. For operational planning, the WG continues with its regular skype meetings. For long-term planning, detailed workshop planning, follow-up on delivered activities and exchange of best practice will be addressed at meetings in connection with WG's/N5T's activities. The groups has been working actively on the following:

- Facilitated research collaboration which resulted in researchers' initiative to work with a joint Climate-KIC proposal
- Mapped Horizon 2020 topics and N5T partner universities' research areas
- Delivered a (pilot) Proposal Development Workshop addressing topic EU Horizon 2020 DT-ICT-11-2019 (Nov 2018 at KTH) and detailed workshop documentation
- Developed and documented a first version of a N5T Proposal Development Workshop concept
- The group will organize a N5T Horizon 2020 workshop on the "Climate actions" in spring 2019 and

topics for 2020 and beyond are being developed.

The group has also discussed challenges in their work and recognizes that the task of pursuing common EU proposals has proved to be somewhat challenging. Organizing workshops on specific Horizon 2020 topics attractive and interesting enough to justify the traveling and time spent needs careful consideration. The group is also aware of the challenges of top-down approach and has been working to facilitate bottom-up initiatives based on Nordic researchers for EU proposals.

The committee recommends the group to adopt a new name - Research Funding Group.

Industry Collaboration

This group was restarted in fall 2018 with several new members on the director level. The first face-to-face meeting took place at Aalto in September 2018 and the follow up meeting at Chalmers in February 2019. the group has now discussed and drafted the mandate for themselves. The mandate was approved in the committee meeting March 2019.

The group has planned a series of five workshops, each with a specific theme and targeted for the staff of the universities working with these issues. Each workshop is planned to accommodate 4-6 participants from each university, i.e. 20-30 participants in total. The first workshop is planned for October 2019 in Copenhagen with a focus on how to develop and deal with strategic partnerships. The workshop is to be organized just before DTU High Tech Summit. The second workshop is planned to take place at NTNU in spring 2020 next to the Teknopolis event and will focus on collaboration with government institutions.

ORGANIZATION AND COMMUNICATION

Communication

The N5T WG communication has continued its work with maintaining and developing the webpages for the joint Master's programs located on each university website. The group has developed new primary JMP web pages with more target audience oriented content and set up a clear process of updating the pages, making the pages more effective and the information more reliable. The group has created a multi annual communications plan outlining the main action points. This includes streamlining the alliance website and print materials. The group met in conjunction with Admission Days at Chalmers in March to develop the communications action plan for 2019 - 20.

It has been observed that group members change with great frequency. This has made it a challenge to maintain good practices and ensure that the skills in the group match the action plan. Harmonizing university specific strategic guidelines with the N5T strategy has also occasionally proved to be challenging.

The committee decided in the March meeting to shift the focus of the group more towards the student recruitment.

European Networks

All N5T universities are active in their own networks such as CESAER, Cluster, IDEALeague and EuroTech. Currently there is no single network with all N5T universities as members. During the reporting period some meetings with TU9 (*RWTH Aachen University, TU Berlin, TU Braunschweig, TU Darmstadt, TU Dresden, Leibniz Universität Hannover, Karlsruhe Institute of Technology, TU München, University of Stuttgart*) were planned but did not materialize due to scheduling reasons.

Number of applications and admitted students during the Admission Days March 2019

| | No of applicants | No of admitted students |
|--|-------------------------|--------------------------------|
| Cold Climate Engineering | 26 | 14 |
| Environmental Engineering | 39 | 18 |
| Innovative Sustainable Energy Engineering | 466 | 86 |
| Maritime Engineering | 85 | 17 |
| Polymer Technology | 30 | 14 |
| Total | 646 | 149 |

N5T Student statistics 2014 - 2018

| | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|-------------|-------------|-------------|-------------|-------------|
| No of admitted students | 148 | 176 | 182 | 157 | 161 |
| No of registered students year one | 38 | 61 | 57 | 50 | 44 |
| No of graduates | 15 | 24 | 30 | 41 | 34 |