

12 Netherlands Institute on Research on ICT

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Information and communications technology (ICT) research at the universities of technology concentrates on refreshing and prioritising individual subdisciplines. The 4TU.NIRICT research centre concentrates on bringing together, positioning and prioritization of all aspects of ICT research. Both multidisciplinary and chain approaches are needed in this rapidly digitising world. Since more than 50% of research conducted at universities of technology in the Netherlands concerns ICT, the research centre can effectively devote itself to strengthening the national ICT research network.

The focus in this regard is on researchers who are at the start of their careers. At the same time, broad collaboration in activities relating to research and education are encouraged through 'research community funding'. Between 2014 and 2017, the largest research programme, 4TU.NIRICT, operated the project entitled 'Big Software on the Run' (BSR). BSR is an independent research programme in which seven research groups from University of Twente, TU Delft and TU/e are taking part.

4TU ICT Research Community

In order to promote cooperation between universities of technology, it is vital to establish and develop a network in which all participants are aware of and have mutual respect for each other's ICT research. Each year, NIRICT organises a community session, and it has used 'research community funding' to sponsor 10 workshops. These workshops were organised by the research community itself on a variety of topics, including Human Computation, IoT, Empathic Lighting and Cyber Security. With the ICTng (ICT next generation) network, 4TU.NIRICT is concentrating on researchers who do not yet have extensive national networks. ICTng was established in close collaboration with the FES COMMIT/programme. Led by Przemek Pawelczak in 2017, who was succeeded by Cynthia Liem in 2018, a core team of young researchers from several Dutch universities was also created. Furthermore, COMMIT/ and 4TU.NIRECT helped to organise and fund a series of meetings featuring inspiring speakers and discussions. In addition, 4TU.NIRICT has established an exchange programme for stimulating mutual mobility, and it will undergo further growth in the coming years. In this programme, researchers can temporarily work one day a week at another TU. Finally, NIRICT enabled four post-doctoral appointments in 2017. These post-doctoral researchers received shared appointments at two universities of technology for joint research projects in which the combined expertise and mutual ties of the research groups constituted a major benefit.

Between 2014 and 2017, NIRICT used stimulus funding to encourage promising bottom-up initiatives in thematic research partnerships. It thereby developed and maintained a research portfolio of important issues with a good chance of receiving external funding. In this period, partnerships emerged on the following topics: Data Science, Cyber Security, Antenna Research, Empathic Lighting, Wirelessly-Powered Autonomous Systems, Smart Industry/IoT, Green ICT and Human Computation, in addition to GPGPU, enabling Constructive Public Discourse on Social Media and Model-based Engineering. Activities developed within these partnerships, include joint workshops, seminars, representation in the Dutch ICT landscape, and efforts have been devoted to writing successful joint project proposals, e.g. the IoT project of TU Delft and the University of Twente, which was funded in the NWO Smart Culture Creative Cities call, and the Human Computation collaboration within the Starting Stimulus (in Dutch, Startimpuls) programme entitled 'Responsible Value Creation with Big Data (VWData)'. With its focus on 'research community funding', 4TU.NIRICT is releasing this substantive line for the coming 2018-2021 period, and it will continue to make an important contribution to collaboration between ICT researchers of the 4TU by supporting concrete network-strengthening activities.

Educational collaboration

4TU.NIRICT aims to reinforce the efficiency, development and implementation of educational cooperation. Each of the universities of technology develops its own educational programmes. An inventory of programmes, courses, materials and MOOCs has been made and, as a result, ICT researchers from the universities of technology are better informed about their colleagues' activities and resources, which in turn helps promote collaboration and the sharing of best practices. In addition, 4TU.NIRICT has contributed to the publication of 'The Human in 2050' by the Future Image of Technology Fund (Stichting Toekomstbeeld der Techniek). Finally, the universities of technology are jointly responsible for implementing and designing the Master's degree programme in Innovation offered by EIT Digital. 4TU.NIRICT's Scientific Director represents the research centre on the EIT Digital General Assembly. Beginning in 2018, the three universities will be members of EIT Digital as independent entities, as a result of the organisational and administrative changes on the part of EIT Digital.

Big Software on the Run

4TU.NIRICT's largest research programme between 2014 and 2017 was the Big Software on the Run (BSR) project. Several appointments and sub-projects will continue to operate in the coming years. The aim of BSR is to analyse software 'in the wild' using big data methods, and to use the results to improve software development methods. Software forms an integral part of the most complex things built by humans. BSR is therefore developing innovative technologies that identify how systems actually work, check where and when systems deviate from expected behaviour, predict reliability, performance and security, and make recommendations to address problems. This approach generates a huge amount of data (Big Data) and very complex software (Big Software). There is extensive co-operation between the participating research groups. A specific example of this is that PhD students are supervised by promotors from two different universities of technology. The groups also use the same infrastructure: in Eindhoven the groups compute large data sets in a single machine, while in Twente the focus is on distributed computing. This efficient use of resources has also been organised with a view to the future, so that it can respond to developments within joint projects in the coming years. Integrating the different disciplines and methods has generated new insights and creativity.

Agenda for 2018

In 2018, 4TU.NIRICT will continue its partnership with ICT.OPEN, the largest gathering of the Dutch ICT research community, and make a substantive contribution towards multiple tracks and sponsoring the Cyber Security Awards. In addition, it will organise the annual Community Day. ICTng is organising a series of sessions and a get-together during ICT.OPEN2018. The new call for 'research community funding' will support a series of activities emerging from the ICT research community. BSR is organising a variety of national consultations and the second, concluding summer school – a major event – alongside the 8th European Business Intelligence & Big Data Summer School (eBISS 2018) in Berg en Dal. In addition, with its 'Tips and Tricks document' for the process of applying for grants, 4TU.NIRICT is focusing on increasing the chances of success for personal grant proposals by ICT researchers