

# Establishing a collaborative network on expressive robots

## Introduction

The 4TU funding for the *Collaborative Network on Expressive Robots* (CNER) was an enabler for establishing a collaboration between researchers from Dutch technical universities and national and international researchers from other needed domains that will make possible to develop expressive robots that convey and grasp meaning and emotions naturally and intuitively. Such a network is needed to keep and further develop the leading position of The Netherlands on this emerging topic since such robots could be better accepted in the society and can add to the solution of multiple societal problems. The development of expressive robots is a complex and multidisciplinary effort, and although robotics is primary a technological domain, social and expressive robots design needs knowledge from many other domains as psychology, sociology and arts. While the need for psychology and sociology is well recognized already present in the technical universities as dedicated departments that integrate psychology, sociology and engineering, the current network seeks to create connections between engineering and movement sciences, arts and dance. To answer questions of how movement contains and expresses meaning and how to apply this knowledge to (social) robots, *Collaborative Network on Expressive Robots* (CNER) connected expertise from several technical domains (such as industrial design, computer science and mechanical engineering) and applied arts domains (including theater and dance).

## Activities

The creation of this network took several steps. First, we met during the Lorenz workshop “Interdisciplinary Workshop on Movement Grammars: Brains, Robots and Dance”, which took place in Leiden University, Snellius center from 4 Jun 2018 through 8 Jun 2018. The dedicated meeting with the members of CNER was on the 6<sup>th</sup> of June, but many of the Dutch participants of CNER took part in the entire workshop. At this first meeting, the participants with a technical background as well as the ones with a

theater and dance background met and drafted a rather broad frame of what the network scope will be. The meeting on the 6<sup>th</sup> of June concluded with a boat trip, which was already a part of the Lorentz workshop agenda and the discussions and the networking continued in a relaxing and friendly atmosphere between the network members and all workshop participants. There were 21 participants of the workshop, from which 6 participants from the Dutch *Collaborative Network on Expressive Robots*, and 7 additional Dutch attendees during the meeting on the 6<sup>th</sup> of June. Presentations by leading international experts on robots and expressivity were followed and practical sessions with dancers and theater-makers took place.

After this meeting an email correspondence took place to focus and fine-tune the collaboration topics and a new meeting was prepared, which was co-located with the Performing Robots Conference: Dialogues Between Theatre and Robotics which took place Utrecht (the Netherlands), in the period 23-25 May 2019. The conference was chaired by a member of the network, Prof. Maaïke Bleeker, and many *Collaborative Network on Expressive Robots* members participated in the conference and the network meeting. The participants were from 4TU, national, but also international partners of the network took part in it since we were planning a European project proposal. At this meeting the EU proposal got concrete framing, and in the following weeks the abstract of the proposal was finalized.

The third stage of this collaboration took place online when we were preparing the EU FET Open proposal, At this period many one-to-one but also group interactions and visits took place.

On 18 of September the FET Open proposal called: CHARismatic Robots that InSpire and MotivAte with the acronym CHARISMA was submitted:

Horizon 2020 Call: H2020-FETOPEN-2018-2020 (FET Open – Novel ideas for radically new technologies) Topic: FETOPEN-01-2018-2019-2020 Type of action: RIA (Research and Innovation action) Proposal number: 899784 Proposal acronym: CHARISMA. The proposal is still under evaluation.

## **Sustainability and continuation**

For the continuation of the *Collaborative Network on Expressive Robots*, we are currently working in several directions.

First, if the proposal is accepted, we can work together on in-depth scientific topics with Dutch and international partners. In the case of failure, the proposal will either be re-submitted at the same or different funding scheme will be identified for submission.

During the process, new Dutch and international partners that work on related topics were identified. The connection with the new partners might be reinforced. Currently, a collaboration with Honda Research Institute and its network is a project and an international consortium related to robot expressivity is being developed, which could be an additional vehicle for the expansion of the *Collaborative Network on Expressive Robots*.

The spring festival held each year in Utrecht, The Netherlands can serve as an annual meeting point for the network participants.

## **Concluding remarks**

As a result of the collaboration, a mutual supervision of bachelor and master students has taken place, and can be further extended. A more important contribution from our point of view is that our understanding on the topic grew, based on our common and focused efforts. A clear drawback was that the EU funding scheme restricted the number of Dutch participants who could be funded. To alleviate this restriction, we made agreements, if the project is funded to co-supervise the Ph. D. students and the postdocs between the universities (for instance, between TU Eindhoven and TU Twente was made). I would suggest to 4TU that arrangements are made that 4TU can apply for European projects as a legal entity. A second suggestion is that 4TU makes an

overview of national funding possibilities that can include several technical universities.

In conclusion, I would like to thank to 4TU for giving us the opportunity to strengthen the connections between researchers from different technical universities on the topic of research that we cherish and letting us connect with researchers from other disciplines and countries.

Dr. Ir. Emilia I. Barakova, assistant professor, [e.i.barakova@tue.nl](mailto:e.i.barakova@tue.nl), +31402478562;  
Prof. Panos Markopoulos, full professor, ID, TU Eindhoven (TU/e)  
Dr. Koen V. Hindriks, associatie professor, EEMCS, TU Delft (TUD)  
Dr. Ir. Dennis Reidsma, assistant professor, HMI, University of Twente (UT)  
Prof. Maaïke Bleeker, DMCS, Utrecht University (UU)