# Sharing meaning with social robots

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At cross purposes? Peter and PR2 point their ways.
Image: UTS

**Peter Gärdenfors** is a professor in the Faculty of Engineering and IT and Senior Professor of Cognitive Science in the Department of Philosophy at University of Lund, Sweden.

A member of the Royal Swedish Academy of Letters, History and Antiquities who serves on the Committee for the Nobel Memorial Prize for Economics, Peter has been an academic in our School of Software since 2014 and an investigator on four ARC Discovery Projects.

So what brings him to UTS, to FEIT and the School of Software?

**Magic!**

**The Magic Lab** and its transdisciplinary research into strategic and disruptive innovations directed by Professor Mary Anne Williams. Her research in social robotics, and human-robot interaction, reflects Peter's own research in inter-subjectivity where he explores the relationship between humans, and between humans and machines, and how we make and manage meaning.

As a cognitive scientist Peter is interested in how we learn to develop skills - including the social skills - that are vital to communication.

> "Social robotics and social interaction is a great current field of research – what can and do humans expect from robots in terms of understanding? Human communication systems are based on many factors, some of which are intuitive to us from our earliest

*interactions, where we acquire an awareness, or consciousness, of others and can learn to anticipate what they want," said Peter.*

'Social' robots are designed to show human social characteristics such as emotional expression, to conduct dialogue, to use and respond to natural human cues such as pointing, and to develop 'social competencies' - that elusive ability to intuitively respond to what other people are communicating through both verbal and non-verbal activity.

For Peter, the work at UTS in social robotics extends some of his current work at Lund, including a 10-year project on *Cognition*, *Communication* and *Learning* sponsored by the Swedish Research Council. He brings to the Faculty a breadth of study into decision-making, having developed several breakthrough frameworks using probabilistic reasoning, belief revision, and conceptual spaces; he also sits on the thesis committee and is a secondary supervisor.

He is curious about how robots can learn and whether can they 'read minds' and learn to display social and emotional behaviour rather than just imitating or mimicking a human action.

*"Human communication is also influenced by our imaginative or inner world experiences, the images we all carry, our social histories, culture and ability to recognise context," he says.*

What we use to create and manage meaning is important to our relationship with social robots in social spaces, such as the human-robot interaction and communication that is occurring in a research collaboration by the UTS Magic Lab with the Commonwealth Bank and Stockland.

In the CBA/Stockland situation, humans in banks and shopping centres can approach CHIP, a 1.7m social robot, for assistance, information and even advice via a torso touch screen. In such interactions, robots will need both social and emotional intelligence for communication, which leads to critical questions about whether a social robot can/should have a particular 'personality' suited to the range of its interactions with humans.

A recent UTS student hackathon involved *Pepper*, a humanoid robot designed with the ability to read emotions, who will represent UTS in the International *RoboCup* competition in July 2017. Students explored the concept of developing a personality to suit the tasks Pepper will be programmed for in the RoboCup @Home League category, responding to challenges that require a high degree of social interaction, ability to demonstrate interaction and cooperation with humans by navigation and mapping, vision and recognition (objects and faces) and adaptive behaviours in different social situations.

In responding to the competition challenges, can a social robot like Pepper demonstrate the competencies to share and make meaning with humans in a fluent and enjoyable way?

*"For the moment, the reality is that a robot is more like a vacuum cleaner than a walking/talking/thinking/feeling automaton who can make the best decisions – it is*

*doing tasks we don't want to do, and more efficiently, which is saving us humans time, and money!" Peter said.*