

IN Your Innovation

User story Radboud Universiteit

IN Your Innovation

For more insight, it's all about the brain

The more we know about our brain, the better we can harness that insight. So at Radboud University in Nijmegen, research is in full swing. And in a laboratory there are both a so-called vestibular chair and a set-up with a speaker arm. Feel free to call it two special projects. Developed for new knowledge, and equipped with Panasonic Industry's control technology and software.

How does the brain process information? What impact does it have on behaviour, cognition and emotions? It is this genuine curiosity that drives science, also at Radboud University in Nijmegen. Here, at the Donders Institute for Brain, Cognition and Behaviour, understanding how the brain works is central. And research focuses on, for

example, how we track sound. A fascinating process, thinks neuroscientist Snandan Sharma. "Because how does that tracking work? Nobody knows exactly. Sound comprises only frequencies. So the brain has to calculate, as it were, where the sound comes from."



IN Your Innovation

Recognising muscle disease

The more grip we get on how the brain works, the more widely we can apply those insights. According to Snandan, think about people who use hearing aids and so-called cochlear implants. “More insight into sound perception can improve the functioning of such devices,” he says. And what about more knowledge of the balance organ and visual perception, which the research in Nijmegen is also focusing on? According to Snandan, it can contribute to, for example, correct and, above all, timely diagnosis of the

muscle disease MS.

“People with MS have difficulty moving the eyes smoothly. Nowadays, a doctor often passes in front of someone’s eyes with a raised index finger. If the person follows the movement smoothly, it looks like the person has nothing wrong and the doctor may not notice an early stage of MS. With new insights, we can reduce the risk of misdiagnosis.”

It’s all about the brain

Achieving such results requires research. A lot of research, for which the institute conducts experiments in its own lab. And it does so with two measurement setups, each in an acoustic-panelled sound booth. Look inside and it is immediately striking how sophisticated the structures are. Just look at those two blue metal axes, as part of the so-called vestibular chair. Sit in this as a test subject and you turn in several directions during an experiment. While doing so, you react in the dark to, say, a flash of light, the researchers measure how you do so with eyes, ears and head. In this way, the experiment provides the necessary data, as it is also collected a little further on via the speaker arm. In the dark, this moves in front of the test subject, giving the researchers more insight into how someone follows sound.



IN Your Innovation

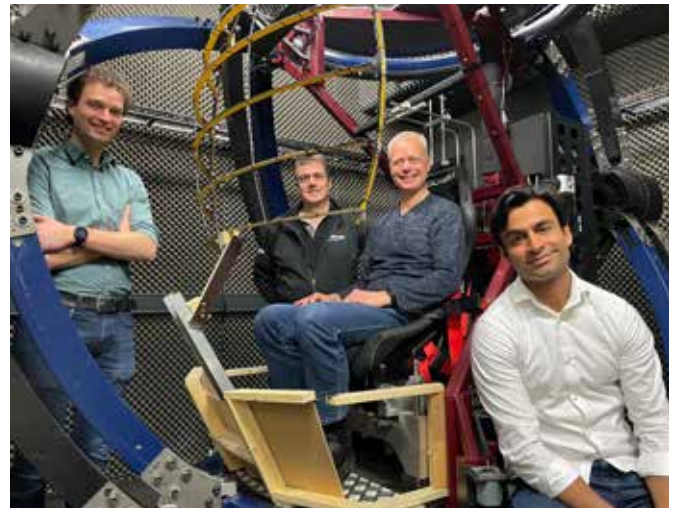
Built as prototypes

There are one or two more universities worldwide with a similar vestibular chair. But apart from that, the installation here in Nijmegen is unique, as is the speaker arm. So taking both machines off just anywhere was out of the question, says Günter Windau, research engineer at the Donders Institute. “Instead, we built them as prototypes. And we modified them as we went along, in order to use them in the best possible way for research.”

So see right there the main challenge of both machines. After all, research changes. And so do the objectives, which means the machines have to meet them time and again. Don’t get Günter wrong, he is happy to pick up on such an adaptation. But given the limited capacity of the institute’s technical department, external support is certainly welcome. So it collaborates with other parties, including Panasonic Industry.

Support was the deciding factor

Prior to this collaboration, they were already working with a vestibular chair at the institute. “That one did work,” says Günter, “although I was never completely satisfied with it from a technical point of view. Adjustments were quite laborious.” So a new chair was chosen, for which Günter very deliberately looked for an industrial design. “A component such as a PLC would allow us to replace it quickly. And I also told that to the team at Panasonic during an industrial fair, which was able to supply me with the necessary hardware. But what pleased me most was the offer of technical support. During that trade fair, we only found that at Panasonic. And it was precisely this support that we were looking for, if we wanted the new vestibular chair to function properly.”



From left to right: Roel Lommers and Roy Claessen from Panasonic Industry, Günter Windau and Snandan Sharma from Radboud University.

IN Your Innovation

Understanding what is needed

So it soon came to a collaboration. In which Roy Claessen, application engineer at Panasonic Industry, helped equip the vestibular chair with sensors, two servo drives, the necessary software and an HMI (Human Machine Interface). A special project, Roy thinks. "Working in a university environment: that alone is fun. Moreover, ever since the start I have been struck by how efficiently we arrive at a solution together here. Günter and I quickly know each other's needs. That works nicely."



Günter agrees. "We have the same background, speak the same language. And that is important: we are dealing with complex and unique installations. Do we want to change that? And do we need to adapt the software for that? Then I can often explain that to Roy in about two minutes - after which he implements it exactly like that." According to Günter, it was therefore obvious that later collaboration was also needed for the speaker arm. "That includes, among other things, three Panasonic drives. As well as a Panasonic PLC, for which Roy had already written most of the software because of the vestibular chair. That saved us a lot of time."



IN Your Innovation

Safe and comfortable

Of course, the experiments have to be as safe as possible. So the European Machinery Directive is the starting point, and there is detection in several places. These include the entrance gates, which prevent anyone from walking into the dark test room during an experiment. In addition, both test rooms contain an emergency stop, although the researchers obviously prefer to stop the machines more comfortably. Because, Snandan notes, don't forget that the whole process has to run smoothly in addition to being safe. "An experiment quickly takes about three hours. We want to avoid people looking back on that with little pleasure."



The plus of the pulse

Ultimately, it is up to the researcher to arrive at the required data with the machines. Whereby the same data should be as complete and detailed as possible, including data on the status of the machine during the experiment. When exactly did the chair start spinning, for example? Such information was unclear until recently, although it is important for a correct interpretation of the experiment. "That's why we added an extra

synchronisation pulse," Roy explains. "Adjustment of the software thus leads to an even better output."

Günter: "In the end, everything is about visibility into the latest possibilities. About the knowledge to connect all those parts together and get them working. We find all that at Panasonic Industry. The way we work together: it has brought us a lot in recent years."

IN Your Innovation

Contribution to society

What we do does not stand alone, thought Konosuke Matsushita, founder of Panasonic. So contribution to society formed very explicitly one of the seven principles he set out for the company. And let that same contribution to society also prevail at Radboud University. "In that respect, we differ little from each other," states Roel Lommers, closely involved in the collaboration as key account manager at Panasonic Industry. "We both want to make our contribution. And I think that shared ambition is the basis of our partnership."

Want to know more?

Read more about the Donders Institute for Brain, Cognition and Behaviour



Curious about the vestibular chair and speaker arm in practice? See how advanced they spin around a test subject? Join us at Radboud University's lab and discover in our vlog how technology provides the basis for greater understanding of the brain. Buckle up!



Over Panasonic Industry

Als onderdeel van de wereldwijde activiteiten van Panasonic Corporation, streven de mensen van Panasonic Industry naar voortdurende innovatie en delen zij de missie en visie van de onderneming - de toekomst ten goede vormen. Om engineering naar een hoger niveau te tillen, onderzoekt, produceert en levert Panasonic Industry technologieën voor een brede waaier van industrieën. Van de kleinste elektronische componenten vervaardigd in miljarden eenheden, tot full-custom batch-size 1 fabrieksautomatisering, onze duidelijke focus op prestaties, kwaliteit en betrouwbaarheid legt de lat hoog in meerdere marktsectoren en ook in industrietrends: industriële automatisering, smart home en gebou-wautomatisering, energieoplossingen, E-mobility en automotive engineering, smart farming en vele andere.

Als integraal lid van Panasonic's wereldwijde familie, zij het met een sterk netwerk van lokale Europese partners, is Panasonic Industry er trots op continue en uitstekende ondersteuning te bieden aan alle klanten.



We are dedicated to the highest standards of global sustainability as **Your Committed Enabler**. Find out more on our [website](#).

Panasonic Industry Benelux B.V.

De Rijn 4 · 5684 PJ Best · Netherlands
E-mail: sales.pibnl@eu.panasonic.com
Tel: 0031-(0) 499 37 27 27
Website: industry.panasonic.eu