

I/O magazine

ICT RESEARCH PLATFORM NEDERLAND

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MATURING FIELD

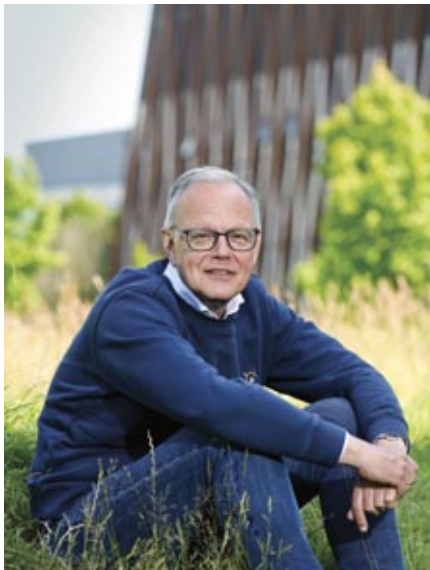
4 | Growing
interest in
computer
science

GROUP PORTRAIT

12 | Digital
touch

CONTAINING; PORTRAIT OF MKB DATALAB-OOST < 10 > IMPROVING POLICE WORK WITH AI < 19 >
LESSONS FROM 10 YEARS OF VERSEN < 22 > NEW DIRECTOR ESCIENCE CENTER < 24 >

16



The rise of IPN and computer science

In conversation
with Mark Kas

24



Space to experiment

Vision of
Menno Rasch,
Netherlands
eScience Center

4

Computer science as a catalyst for societal impact

How ICT research is increasingly valued

8

Advocating a broader view on digitalisation

Rathenau-report about future of digital Netherlands

9

IPN/NWO news

Nieuwspoort session, Future Leaders Lab, IPN becomes foundation, IPN Service Awards

10

Gaining more than deemed possible

How MKB Datalab-Oost helps SMEs use AI wisely

COLOFON

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12 | Bringing touch to the digital world

Portrait of TU Delft's Haptic Interface Technology Lab

18 | Using brain signals to improve video AI

Iris Groen about her NWO Vidi project BrainShorts



19 | Inside the National Police Lab AI

Bridging the gap between deep computer science and daily police work

22 | Hammering home a joint message

VERSEN as a first in a series of portraits of IPN's Special Interest Groups



IPN ICT-RESEARCH
PLATFORM
NETHERLANDS

PAUL KLINT

The Odyssey – Will we fall for the millennia-old trick?

Christopher Nolan's *Odyssey*, starring Matt Damon as Odysseus, was the undeniable blockbuster of the summer. Early in the film, we see the interior of the famous Trojan horse: men sitting and waiting, and even drowning, before the horse is finally pulled from the sea into Troy, where it dramatically unleashes its devastating effect.

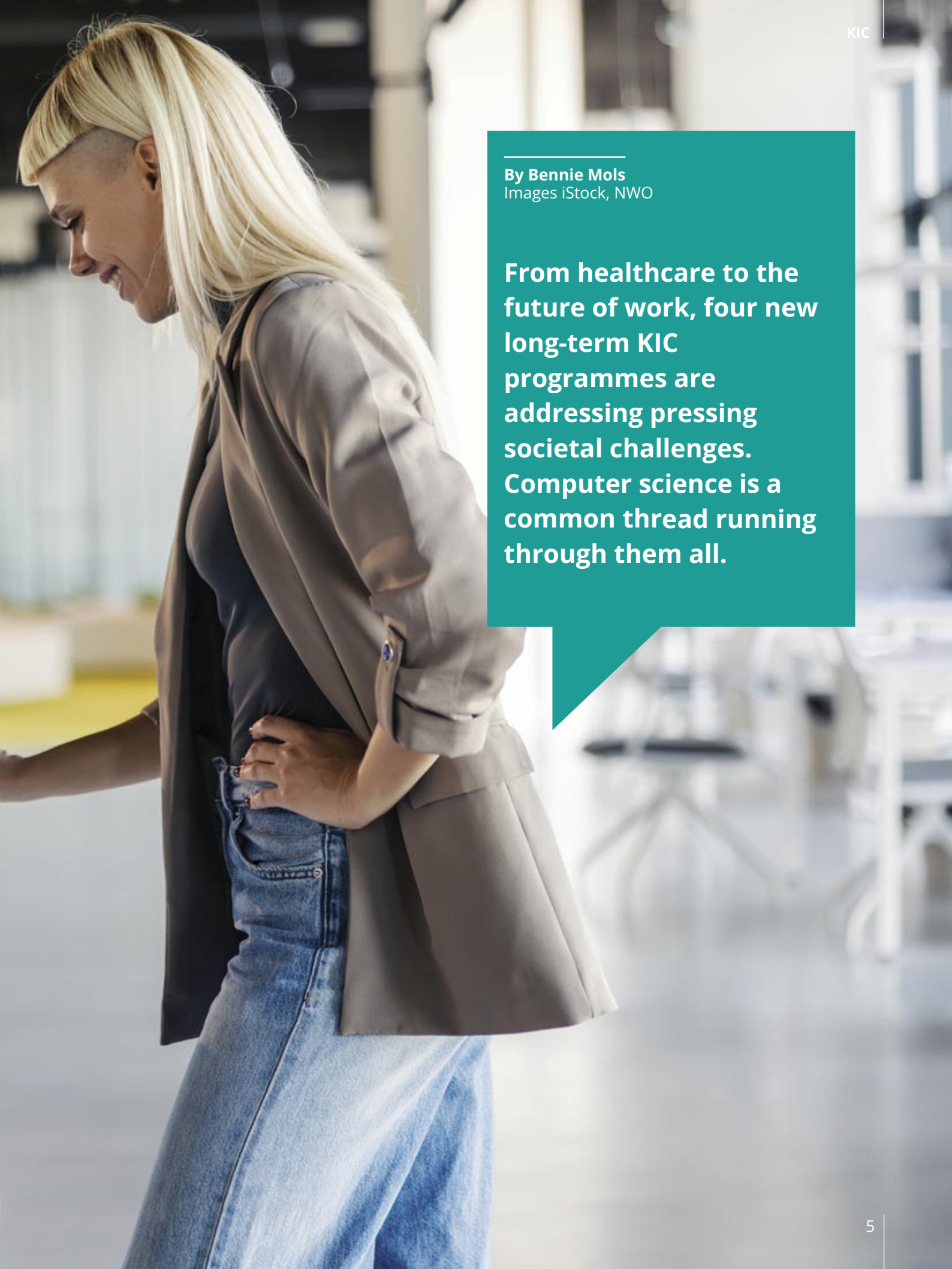
As Wikipedia aptly describes it, the term 'Trojan horse' is used metaphorically for any tactic that lures a target into admitting a concealed threat into a protected space by disguising harmful intent behind a benign exterior and enabling deception or subversion from within. In computing, we mostly use the term to refer to malware. We encounter it almost daily, and it causes mayhem at huge cost.

But what if the daily flood of malware Trojan horses is diverting our attention from the real Trojan horse: the one carrying the AI elite into the heart of our society and systems? Altman, Amodei, Huang, Nadella, Pichai, Wenfeng, and others wait gleefully inside until we pull the horse through the gates. Opinions differ wildly about the effects of AI. Will all diseases be cured and the prospect of death be banished? Or will society be ripped apart and dystopia descend upon us? Today, truth, cybersecurity and the environment have already become some of the most direct victims of AI, in my view.

Like the Trojans, we're fascinated by a seemingly magnificent horse whose true intentions are not yet clear. Helen, at least, had the good sense to look beyond appearances. Perhaps we should do the same before we let this horse through the gates. After all, free gifts rarely come without strings attached.

COMPUTER SCIENCE AS A CATALYST FOR SOCIETAL IMPACT





By Bennie Mols
Images iStock, NWO

From healthcare to the future of work, four new long-term KIC programmes are addressing pressing societal challenges. Computer science is a common thread running through them all.

In April 2026, NWO awarded €65 million to each of four ambitious ten-year research programmes under the Knowledge and Innovation Covenant (KIC), which were selected through a highly competitive national call. Although the programmes address wide-ranging challenges, from healthcare to the future of work and sustainable computing, they all rely on computer science as a key enabling discipline. Its contributions include AI for medical diagnosis and everyday healthcare, brain-inspired computing, and human-centred AI and robotics for the workplace.



Jasper Reijnders

'It just so happens that many of the strongest proposals rely on ICT'

Jasper Reijnders is the director of the Thematic Programmes at NWO. He oversees research programmes under the Dutch Research Agenda (NWA) and the Knowledge and Innovation Covenant (KIC), international collaborations, and the National Growth Fund. Together, these account for roughly one-third of NWO's research funding budget.

In their current form, the KIC programmes have been in existence for about 10 years. 'The aim of KIC', says Reijnders, 'is to develop innovative solutions to major societal challenges while strengthening the economic competitiveness of the Netherlands. It does so by fostering collaboration between knowledge institutions, industry and government.'

The KIC programmes awarded last April are specifically intended for the long term: a period of 10 years. Other KIC programmes have a shorter duration. Together, the KIC programmes translate the priorities of the Dutch Knowledge and Innovation Agendas (KIAs) into concrete research collaborations. Reijnders: 'While the KIAs define the country's strategic research and innovation priorities, the KIC programmes provide the framework through which these priorities are implemented and funded.'

NWO actively facilitates consortium building within the KIC programmes, recognising that successful long-term collaborations require researchers, companies and societal partners to develop a shared agenda before the research even begins. Each programme requires at least 50 per cent co-funding from external partners, reflecting a strong commitment from industry and other stakeholders. The selection process takes around 18 months and includes

international peer review, interviews, and an assessment of both the scientific quality of the proposal and the strength of the consortium.

Rising prominence

Over the past decade, Reijnders has seen the role of computer science in KIC programmes become increasingly prominent. 'We do not explicitly evaluate proposals based on their ICT component,' he says. 'We assess their overall quality. It just so happens that many of the strongest proposals, in one way or another, rely on ICT.'

One example of the impact KIC funding can have is the RAIL Lab, where researchers work with NS and ProRail to use AI to improve railway planning. Supported by the ten-year ROBUST programme, which is partly funded by KIC, the collaboration has already helped reduce planning time for medium-sized railway hubs from 2 days to 10 hours, with the ultimate goal of bringing it down to 1 hour.

According to Reijnders, what makes the four new KIC programmes particularly interesting is that they do not develop digital technologies in isolation. Instead, they embed them within concrete societal contexts, such as healthcare, physical work and energy-efficient computing. 'That combination of technological innovation and societal impact is exactly what KIC is about.'

Strong evolution

Reijnders sees the prominence of computer science as an outcome of the KIC selection process. Yvette Tuin, who has been closely involved with Dutch computer science policy for nearly two decades, sees a broader shift behind it. Tuin has headed the KIC programmes since April this year. Over the past eighteen years at NWO, she has held a variety of positions, all closely connected to computer science research in the Netherlands. During that time, she has witnessed the field evolve from a supporting discipline into the backbone of four long-term, multi-million-euro KIC research programmes.

'When I started at NWO in 2008,' says Tuin, 'computer science was mainly a cross-cutting theme, first in the so-called Key Areas, later in the Top Sectors. But to be honest, that was more just talk than something that actually had much impact.'

Over time, however, researchers from all disciplines increasingly recognised that computer science is not simply a tool for operating computers, but a discipline that enables research across virtually every field. 'Computer scientists realised that both research in ICT and research using ICT are crucial if the Netherlands is to remain internationally relevant,' says Tuin. 'Research proposals increasingly treat computer science as an integral component rather

than an add-on. And we now see that reflected in the KIC programmes.'

Tuin attributes this development not only to the growing importance of computer science itself, but also to a change within the discipline. Over the past decade, computer scientists have increasingly presented themselves as a coherent community with a shared agenda. Rather than focusing on internal differences and competition, they have learned to speak with one voice about the value of their field and the importance of collaborating with other disciplines. Tuin: 'Computer scientists have increasingly established themselves as a strong community: this is who we are, this is what we stand for, this is why it matters, and we want to collaborate both with other computer scientists and with our partners.'

As a result, computer science has also become increasingly prominent in NWO's shorter-term funding programmes, says Tuin. 'The Knowledge and Innovation Agenda (KIA) for Agriculture, Water and Food, for example, has itself chosen AI as a priority, not because the computer science community pushed for it. The same is true for the Knowledge and Innovation Agenda for Security, where cybersecurity has become one of its five missions.'

Closer collaboration

Looking ahead, Tuin believes that future long-term research programmes such as KIC will require even closer collaboration between computer science and other disciplines. 'This collaboration has been successful and will only grow in importance. Computer scientists will increasingly need to ask themselves: Who should I collaborate with? How can I do that? And how do I ensure my research remains relevant?'

Challenges in areas such as healthcare and the energy transition increasingly demand new computational tools. At the same time, they inspire entirely new research questions within computer science itself. Medical imaging is a good illustration, says Tuin. 'The collaboration between medicine and computer science presents computer scientists with new, fundamental questions, while driving progress in medicine.' Neuromorphic computing is another example: the search for more sustainable information processing has stimulated a fundamentally new way of thinking about computing, inspired by the remarkable energy efficiency of the human brain.

'Many societal challenges require smart solutions, and computer science has a vital role to play in developing them,' Tuin concludes. 'Sometimes that requires fundamental breakthroughs in computer science itself. In other instances, it means applying existing computer science in innovative ways.'

Yvette Tuin

'Research proposals increasingly treat computer science as an integral component rather than an add-on'



FOUR NEW 10-YEAR KIC PROGRAMMES

The Dutch Knowledge and Innovation Covenant (KIC) is an NWO public-private research programme that funds long-term collaborations between academia, industry and government to address major societal challenges and strengthen innovation. In April 2026, NWO invested €65 million through KIC in each of four ambitious transdisciplinary research programmes. Each programme lasts 10 years.

Trinitas HORIZON will develop an AI-supported diagnostic platform that brings together all patient information and helps general practitioners make better decisions faster.

AI4Health aims to integrate trustworthy, safe, and fair AI into everyday healthcare by improving patient care, reducing pressure on healthcare professionals, and ensuring that AI innovations reach clinical practice.

Towards a National Centre for Shaping the Future of Physical Work aims to improve physical work by developing technological, social and organisational innovations that help workers and address growing labour shortages in vital sectors. It will develop innovations in human-centred AI and robotics.

10X-Factor(y) aims to make the Netherlands a world leader in energy-efficient, brain-inspired computing by accelerating the development and adoption of neuromorphic technologies for applications such as AI, autonomous systems and healthcare.

More information

www.nwo.nl/en/news/four-consortia-receive-65-million-euro-for-long-term-transdisciplinary-research

ADVOCATING A BROADER VIEW ON DIGITALISATION

By Sonja Knols

Image iStock

In its coalition agreement, the Jetten government lists a number of digitalisation ambitions. But the current policy priorities in this field are too narrowly worded, researchers at the Rathenau Instituut state. In their recent advice 'Naar een beter digitaal Nederland' [Towards a better digital Netherlands], they advocate for a broader view on the topic, lead author of the report Bart Karstens explains.



'The current approach runs the risk of missing out on a number of pressing societal challenges'

In 2021, the Rathenau Instituut published the report 'De stand van digitaal Nederland' [The state of digital Netherlands]. Several recommendations from that report found their way into the digitalisation strategy of the Rutte IV government. 'However, that government did not last long. Meanwhile, much has happened in the world. Furthermore, the policy priorities have narrowed in focus,' states Karstens as he starts telling the tale of how this new report came about.

The national government now focuses primarily on its own digital infrastructure, on how to strengthen the economy through AI industry policy, and on prohibiting addictive and polarising algorithms on social media. This approach runs the risk of missing out on several pressing societal challenges.' The new report links key results from the Rathenau Instituut's recent research on digitalisation to the objectives set out in the coalition agreement. Karstens: 'Based on these, we have made recommendations for a more elaborate digitalisation policy.'

TARGETS AND MEASURES

For example, the report advises the government to set clear targets and take concrete measures to reduce digital dependency. When it comes to a safe and healthy digital environment, the Rathenau Instituut recommends that the government tackle problems at their source, for example, by enforcing regulations regarding harmful platform design and by addressing the social issues that foster insecurity and online hate. And for new developments such as those in quantum and neurotechnology, the report argues that the government should not wait and see what emerges, but should instead anticipate the promised applications and begin to address potential concerns.

With the report, the authors aim for more thoughtful policies, Karstens says. 'Take digital autonomy: where do you believe Big Tech should and should not play a role? Who will develop public alternatives, and how will the government put such a contract out to tender? At the moment, there is no shared vision on these types of issues, yet there should be.'

LESSONS FOR ALL

Although the report is primarily aimed at the government, it also contains lessons that other relevant actors need to take on, Karstens believes. 'Although the government has an important voice when it comes to setting rules and enforcing them, our digital society is not solely their responsibility. It requires a joint effort from a wide range of stakeholders, ranging from academia and industry to educators.' Scientists should ask themselves more often what kind of society they want to contribute to, states Karstens. 'That does not mean there should be no room for fundamental research. But it is important to realise that computer science is having an ever-greater impact on society. That comes with an increased responsibility to develop technology for good.'

Download the report 'Naar een beter digitaal Nederland' (Dutch only) from the website www.rathenau.nl

IPN BECOMES A FOUNDATION

In June 2026, IPN became an independent foundation. IPN started as a collaborative platform uniting universities, research groups, and scientific leaders. Now it has grown into a national organisation representing nearly 1,000 academic staff and over 20,000 students in computer science and related fields.

IPN's transition into a foundation reflects the maturity of the field, the importance of computer science in society, and the need for a strong, stable organisation to guide the next decades of innovation. As a foundation, IPN is now better positioned to support the researchers, students, and institutions that drive the Dutch digital future.

BUILDING DIGITAL AUTONOMY

During the annual Week of Digitalisation in September, IPN organised a Nieuwspoort session on digital autonomy. During this session, university researchers and partners from the field demonstrated how computer science supports governments and organisations in strengthening the digital resilience and strategic autonomy of both the Netherlands and Europe. Researchers, policymakers and representatives from the business community took part in three panel sessions, discussing the future of AI and software, data infrastructures, and energy and IT infrastructure.



FUTURE LEADERS LAB

In May, the first edition of IPN's Future Leaders Lab for junior researchers was completed. This learning line brings together emerging leaders in computer science from across the Netherlands. The programme focused on leadership, research impact, collaboration, and building strong scientific communities. The central question that guided the journey was 'How do we help shape the future of our field?'

TWO IPN SERVICE AWARDS

Both Inald Legendijk and Lynda Hardman received the IPN Service Award 2026. The award recognises persons who have provided outstanding service to the IPN community.

Lynda Hardman, Principal Researcher and Strategist at CWI and Professor of Multimedia Discourse Interaction at Utrecht University, has been a transformative force for equity, diversity, and inclusion (EDI) within IPN and across Europe. Lynda helped establish gender representation requirements in IPN's founding statutes. She also founded the IPN EDI working group, which plays a key role in improving equity, diversity, and inclusion in the Dutch ICT community. As an ambassador for IPN within Informatics Europe, Lynda amplified the Dutch computing community's voice on the European stage, serving as President of IE from 2016-2017 and ensuring that all Dutch computer science departments gained membership.

Inald Legendijk, Distinguished Professor in Computing-based Society at TU Delft, has played an instrumental role in shaping the national computer science research landscape as we know it now. Over several decades, Inald has held a wide range of managerial positions, where he worked hard to secure budgets for computer science research. He has also served on many assessment committees, often as chair, where he pursued a constructively critical approach that invariably improved the quality of research awarded funding.



MKB DATALAB-OOST: GAINING MORE THAN DEEMED POSSIBLE

The MKB Datalab-Oost, located at Radboud University and the University of Twente, supports small and medium-sized organisations in becoming more efficient and effective with AI. Their accessible approach clearly works.

By Leendert van der Ent Images iStock, MKB Datalab-Oost

In 2022, NWO launched the Long Term Programme ROBUST, a large-scale collaboration between universities and large companies to boost AI applications. 'Very important, but not meant for SMEs, though they are the backbone of the Dutch economy', Dirk van Schaijk, general manager MKB Datalab-Oost explains. 'That is why the Ministry of Economic Affairs (EZ) launched a similar arrangement for SMEs in seven regions of the Netherlands.' Van Schaijk sought a partnership with regional investment company Oost NL, and things started to move.

VARIOUS BACKGROUNDS

Through the MKB Datalab-Oost, students of Artificial Intelligence and Data Science organise workshops for businesses, carry out projects commissioned by companies, and help entrepreneurs take their first or next steps in the field of AI and data. Companies that apply for projects come from a broad range of sectors, including manufacturing and healthcare, as well as logistics and business services. Van Schaijk: 'Demand is also very diverse.

Many organisations are aware that they could or should make use of AI, but do not know where to start. Others already use AI and wonder whether they utilise all its possibilities. What better way to find answers than with a student who does it for you? Projects typically run for 10 weeks. A student – who does this as a side job – has 80 hours available to answer a challenge, for instance by analysing opportunities, prioritising 10 ideas on a longlist, based on a combination of expected impact and (time) investment. The two or three most promising applications are developed into a plan of action.

'An important eye-opener for most clients is that many applications turn out to be based on computational models for machine learning instead of on Large Language Models and generative AI,' Van Schaijk remarks. 'Planning incoming orders, inventory management or staff planning are, for instance, computational puzzles for which a computational model can be trained. A typical reaction we get to that is: "Is that also AI?" Applications like these influence vital corporate processes much more fundamentally than LLM applications – and thus than the



Dirk van Schaijk

'WE KEEP THE THRESHOLD FOR PROSPECTS AS LOW AS POSSIBLE'

prising: a model built on a database of 40,000 houses in Nijmegen that can predict which houses will enter the market in the next year. Training helped eliminate false positives and negatives, resulting in 500 houses with a high likelihood of coming on the market. Ten per cent of these are marked to enter the market with a high degree of certainty. This is absolutely vital information for a real estate agent.

A final entirely different example involves the organiser of the parties surrounding the International Four Day Marches Nijmegen (Vierdaagsefeesten). During the festivities, a thousand acts perform on numerous podiums around the city. The challenge here was to apply AI to crowd control issues, for instance, by matching the sometimes-vastly-increasing popularity of acts such as Roxy Dekker or Bankzitters to podium size. To prevent large crowds at small podiums, Spotify streaming data are now combined with press articles to ensure the right match between podium size and popularity. The AI model also assigns possible political or societal issues relevant to certain acts. Also, genre-based arrangement enables optimised routing. All variables are mapped, and possible issues are visualised with red flags.

Where does the success of the initiative come from? 'MKB Datalab-Oost operates on the basis of a good regional network. Furthermore, we run a separate organisation with its own logo. That is important because SMEs associate universities with being difficult and doing things in the long term. We keep the threshold for prospects as low as possible in terms of language (Dutch), location, and general look and feel. That works. Our clients already employ several students; one of them even as a CTO.'

www.mkbdataboost.nl

client anticipated. It turns out there is much more to gain than applicants thought possible. And after 3 years, projects go deeper and deeper.'

HIGHER UP-TIME

Foam and rubber specialist EKI in Nijmegen provides an excellent example of this trend. The company has now issued three 80-hour projects. This has resulted in an optimised manufacturing planning process based on machine data history. The result: significantly higher up-times for their machines.

An entirely different example comes from the real estate world. A real estate agent came to MKB Datalab-Oost with the general question: 'How could AI help me in my work?'. He thought of communication, but his 'data buddy' came up with something sur-





Bringing touch to the digital world

By Bennie Mols Images Ivar Pel



GROUP PASSPORT

HAPTIC INTERFACE TECHNOLOGY LAB (HITLAB)

RESEARCH FIELD

SURFACE HAPTICS, TACTILE PERCEPTION &
DIGITISATION, WEARABLE HAPTICS & SENSING FOR
EXTENDED REALITY (VR, AR)

INSTITUTION

DEPARTMENT OF COGNITIVE ROBOTICS, FACULTY OF
MECHANICAL ENGINEERING, TU DELFT

EMPLOYEES AS OF SEPTEMBER 2026

TOTAL 8:

1 ASSOCIATE PROFESSOR

5 PHD STUDENTS

2 MASTER'S STUDENTS

WEBSITE

www.hitlabtud.nl

Researchers at TU Delft's Haptic Interface Technology Lab are developing technologies that allow people touch the digital world as naturally as the physical one.



Yasemin Vardar

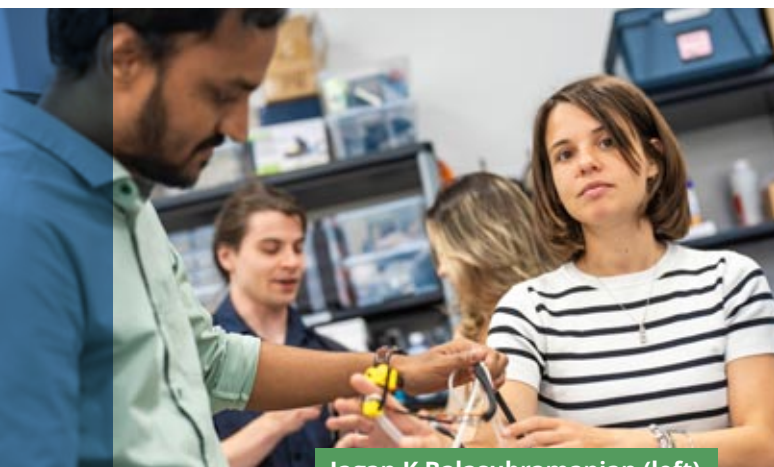
Imagine placing your hand on your phone's screen and feeling the touch of a loved one on the other side of the world. It may sound like science fiction, but for TU Delft associate professor Yasemin Vardar, it is a powerful motivation. Having lived far from her family in Turkey for half of her life, she wants to make digital communication not only visible and audible, but also tangible.

Vardar founded the Haptic Interface Technology Lab in 2020 and now leads a team of five PhD students and two master's students. 'Our research has two main goals', she says. 'The first one is to understand how humans perceive their surroundings through their skin. The second one is how we can translate this touch information in the digital world.'

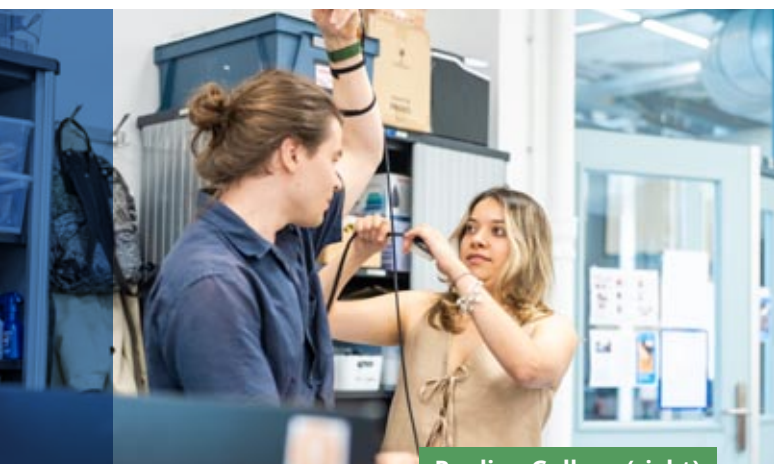
Unlike vision and hearing, touch is inherently multimodal. Our skin simultaneously senses pressure, vibration, temperature, friction and stretch. That complexity has made touch much harder to digitise than images or sound. However, over the past six years, Vardar's group has achieved several breakthroughs, which even resulted in a patent application. 'We developed different types of multimodal haptic devices, including a pen, a screen and a ring. They can render several tactile sensations at once, including pressure, vibration, friction and temperature.'

Another of the group's achievements is an algorithm for perceptually lossless texture compression. Much like JPEG compression reduces an image file while preserving its perceived quality, the algorithm compresses tactile information. 'The result is a much simpler digital representation that still feels identical to the original texture', Vardar says.

Digitising touch has a wide range of potential applications. 'What really motivates me is communication in social settings,' says Vardar. 'Adding touch will allow us to convey more emotion. In healthcare, realistic haptic feedback could improve medical training and telemedicine by allowing clinicians to interact with lifelike virtual tissues. Education could also benefit, enabling students to literally feel physical concepts, for example. Other applications include tactile feedback for car and aircraft cockpits, an area in which we are actively collaborating.' In 2025, Vardar was awarded an ERC Starting Grant to push haptic technology even further by transforming everyday surfaces, such as tables, walls and fabrics, into interactive interfaces.



Jagan K Balasubramanian (left)



Paulina Gallego (right)



Sensing texture

Jagan K Balasubramanian was doing his master's research on haptic technology in Chennai, India, when he came across scientific papers by Yasemin Vardar. Fascinated by her work, he contacted her about a possible PhD position. He became the first PhD student to join the HIT Lab and, now in the fourth year of his PhD, also serves as the lab coordinator, helping to keep the experimental equipment in order.

His own research seeks to identify the fundamental building blocks of the sensation of roughness and friction, just like red, green and blue are the building blocks from which our eyes perceive all colours. 'We have developed an initial model with only two parameters,' says Balasubramanian. 'Using these two parameters, we can represent most textures. We tested the model on five different materials, ranging from paper and wood to plastic and rubber.'

One remaining challenge, however, is that some textures cannot be represented by just two parameters. Balasubramanian is therefore refining the model to capture these differences better. 'We may need more than two parameters,' he says, 'but we still want to find the minimum number required to recreate the sensation of a texture. Keeping that number as low as possible is crucial for efficiently storing, transmitting, and creating new synthetic digital touch information.'

Hardware for healthcare

Paulina Gallego joined the HITLab as a PhD student in February 2026. While Balasubramanian focuses on the software needed to recreate tactile sensations, Gallego is developing the hardware. 'My goal is to create a wearable device that can reproduce the feeling of touch on any surface,' Gallego says. 'Imagine you are shopping for a dress on your phone. While using the

device, you touch the image on the screen and can actually feel what the fabric is like. Previously, a ring was developed in the lab, but that was not precise or portable enough for this goal.'

Although virtual shopping is an appealing application, her greatest motivation lies elsewhere. 'I have always been drawn to working for what others need', Gallego says. 'Ultimately, I hope the wearable haptic device can contribute to different types of applications, such as sensory rehabilitation after a stroke. Some patients experience difficulties interpreting the tactile properties of objects, even when they can still perform the required movements. By selectively rendering or enhancing cues such as friction, softness and temperature during interactions with everyday objects, the device could support personalised tactile training.'

Through experiments with human participants, Gallego will build on other research conducted in the HITLab to investigate how people perceive materials, which sensations are essential to reproduce, and how these sensations interact. Those insights will guide the design of wearable haptic devices that bring the sense of touch into the digital world.





After obtaining his PhD in Dutch Linguistics, Mark Kas started as a policy officer at the University of Groningen (RUG) in 1993. In 1999, he switched to NWO to become Team Lead, Informatics, and later Senior Manager, New Developments. In 2017, he returned to the RUG, where he mainly worked as Team Lead Research Strategy and Partnerships.

THE RISE OF IPN AND COMPUTER SCIENCE

In 2000, Mark Kas played a major role in establishing the ICT Research Platform Netherlands (IPN). How does he look back on that era, and how has Dutch academic ICT research developed since then?

By Leendert van der Ent

Image Henk Veenstra

Why was IPN founded?

'During the 1990s, the phenomenon of "research schools" was popular; these were useful organisations but without much money. In the realm of informatics/computer science, there were five national research schools, plus the research institute CWI, and the research foundation SION. In 1999, SION transformed into the Advies Commissie Informatica, which was part of NWO. It was clear to me that creating unity and supplying a dedicated budget would make a huge difference. Together with the field, I set out to realise that.'

How did that work?

'We first drafted the National Research Agenda Informatica (NOAG-i), an idea of SION director Yuri Berkhoff. This helped better align priorities. Before, informatics researchers used to discuss priorities publicly, whereas, for instance, astronomy kept discussions internal to show a unified front to the outside world. IPN was meant to be the platform for internal discussions. But there is a huge difference with, for instance, chemistry. In that sector there has been close and fruitful co-operation between corporate research and academic research for many years. In general, the challenge for informatics in the Netherlands is the low amount of corporate informatics research that academic research can be aligned with.'

How has the platform developed since then?

'In 2005, partly as a result of the involvement of an industrial base, hardware research was included in the new NOAG-ict. The Ministry of Economic Affairs

became interested in the topic, which led to PROGRESS, an embedded systems programme at STW, and the JACQUARD programme at NWO to boost software engineering. After 2009, I switched to chemistry, which made it harder to follow informatics closely. But IPN clearly weathered all storms for a quarter of a century.'

How do you view ICT development in general?

'Where to start? The role of ICT in society has increased tremendously. As a consequence, ethical questions have become more important in informatics. Banks have become software companies and Dutch fintech has developed well. Apart from that, Europe is faced with a tremendous geopolitical challenge. ICT plays a pivotal role in enabling Europe to become more energy-independent, militarily self-supporting, and cyber-resilient. Concerning AI, Europe could play an important role in specialised AI and AI based on high-quality data. Given these enormous challenges, the Netherlands would do well to learn from Ireland, France, Germany and Scandinavia, which have all hugely and steadily invested in ICT.'

What is the added value of bringing scientific researchers together?

'Ministries like to deal with well-organised fields. That means you need to organise yourself first before you can acquire influence. As IPN demonstrates, it always pays off to unite and professionalise.'

Using brain signals to improve video AI

By Bennie Mols Image iStock

By comparing brain activity and AI video models, the NWO Vidi project 'BrainShorts' seeks to uncover how humans understand video and how AI can learn to do so more efficiently.



These days, an AI video model can easily recognise when someone is cutting a tomato. It can even generate a video of someone cutting a tomato. But in the generated video, something strange happens. The tomato doesn't split into two pieces where the knife cuts, but somewhere else. We immediately realise: this can't be right. The AI video model, however, has no clue.

Last May, Iris Groen, associate professor at the University of Amsterdam, started the 5-year NWO Vidi project BrainShorts to understand the similarities and differences between how the human brain and AI video models perceive moving images. Groen is appointed at both the Informatics Institute and the Psychology Research Institute. Her field of research is called neuroAI: a combination of neuroscience and AI.

Collecting EEGs

Almost one-third of the human brain is involved in visual processing. While scientists have learned a great deal about how the brain recognises faces and objects in static images, much less is known about how it makes sense of moving scenes. BrainShorts investigates how the human brain understands short videos while also exploring how insights from neuroscience can help make AI video models more capable and energy-efficient.

'In the Vidi project,' says Groen, 'we will show participants short videos lasting less than 3 seconds – hence the term BrainShorts – while asking them some questions. At the same time, we will use EEG to measure electrical activity in their brains. Collecting a large EEG dataset is a key objective of the project. The dataset is intended to serve as a benchmark for AI video

models: we want to feed AI models the same videos and then see how well they can predict what is happening in the brain.' 'The human brain is remarkably efficient,' says Groen. 'It runs on only about 20 watts of power and needs relatively little time to understand what is happening in a video. Within a couple of milliseconds, you can grasp how a complex event unfolds. AI video models can already recognise many actions, but they require vastly more data and computation to achieve similar results.'

First insights

Groen has recruited the first PhD student for the project and will soon hire a postdoctoral researcher and a research assistant. Although the project has only just started and has not yet produced new results, a recent study conducted in preparation for BrainShorts already offered some interesting insights.

'We compared an existing dataset of human brain activity with one hundred different AI video models', Groen tells. 'The comparison showed that there is no single best-performing model. In fact, human visual understanding appears to involve at least two distinct stages. In the first stage, you recognise what you see in an image: faces, objects, and so on. At this stage, simple image-recognition models perform just as well as specialised video models. In the second stage, the focus shifts from recognition to what we call dynamic tracking: monitoring how elements in a scene change over time. The fact that there is no single best-performing model suggests that current AI models process video in ways that differ fundamentally from the human brain, and that we can still learn from the brain how to improve AI.'

INSIDE THE NATIONAL POLICE LAB AI

By Marysa van den Berg
Images WAT ontwerpers,
iStock

Beyond the sci-fi hype of autonomous robot detectives, the National Police Lab AI focuses on a realistic challenge: conquering data. In a unique collaboration between academia and law enforcement, the lab bridges the gap between deep computer science and daily police work.

An AI detective that peeks through evidence data and directly knows who to arrest, or even who is about to commit a crime. This Hollywood image of the future of police work is far away from the reality of modern law enforcement. Instead of building autonomous digital police officers, the National Police Lab AI (NPAI) focuses on helping human investigators process massive amounts of digital data.

According to Floris Bex, Professor in Artificial Intelligence and Law and Scientific Director of the NPAI, the lab was founded to centralise research that was previously highly fragmented. 'From the university side, we were working together on smaller, single projects,' Bex explains. 'We had different people working on different projects across various universities (Amsterdam, Eindhoven, Utrecht). At some point, together with Amsterdam and later Delft, we said: Why not start a Police Lab where we bundle all the work on AI development and policing?'

Sifting through data

NPAI was founded in January 2019, before ChatGPT and Large Language Models (LLMs). 'Machine learning was already a big thing, but we saw that many tasks at the police require rea-



soning according to certain legal or policy rules,' Bex says. 'That didn't fit naturally with just machine learning classification tasks. So, we began using a hybrid approach: we want people to interface with the police in normal language (data/neural AI), but when you start reasoning with that knowledge – for example, to determine whether a report is about fraud – you need legal and policy rules. Symbolic AI better covers that aspect.'

Bas Testerink, AI scientist at the National Police, emphasises that this hybrid, neurosymbolic framework is essential because off-the-shelf data models lack the necessary domain expertise. An example of this methodology in action is the AI4Intelligence project, which aims to create tools and methods to parse massive, complex data sources. Such research output can eventually help the police to better deal with crypto communication files or clustered cybercrime patterns.

As Testerink explains, symbolic reasoning is critical here to uncover organised criminal networks that generic algorithms miss: 'We have a PhD student working on digital fingerprints in cybercrime. Can you determine from the victim reports whether an organised group is behind it? You try to reason over bundles of reports rather than looking at individual ones, linking patterns even when they use multiple money mules and different bank accounts.'

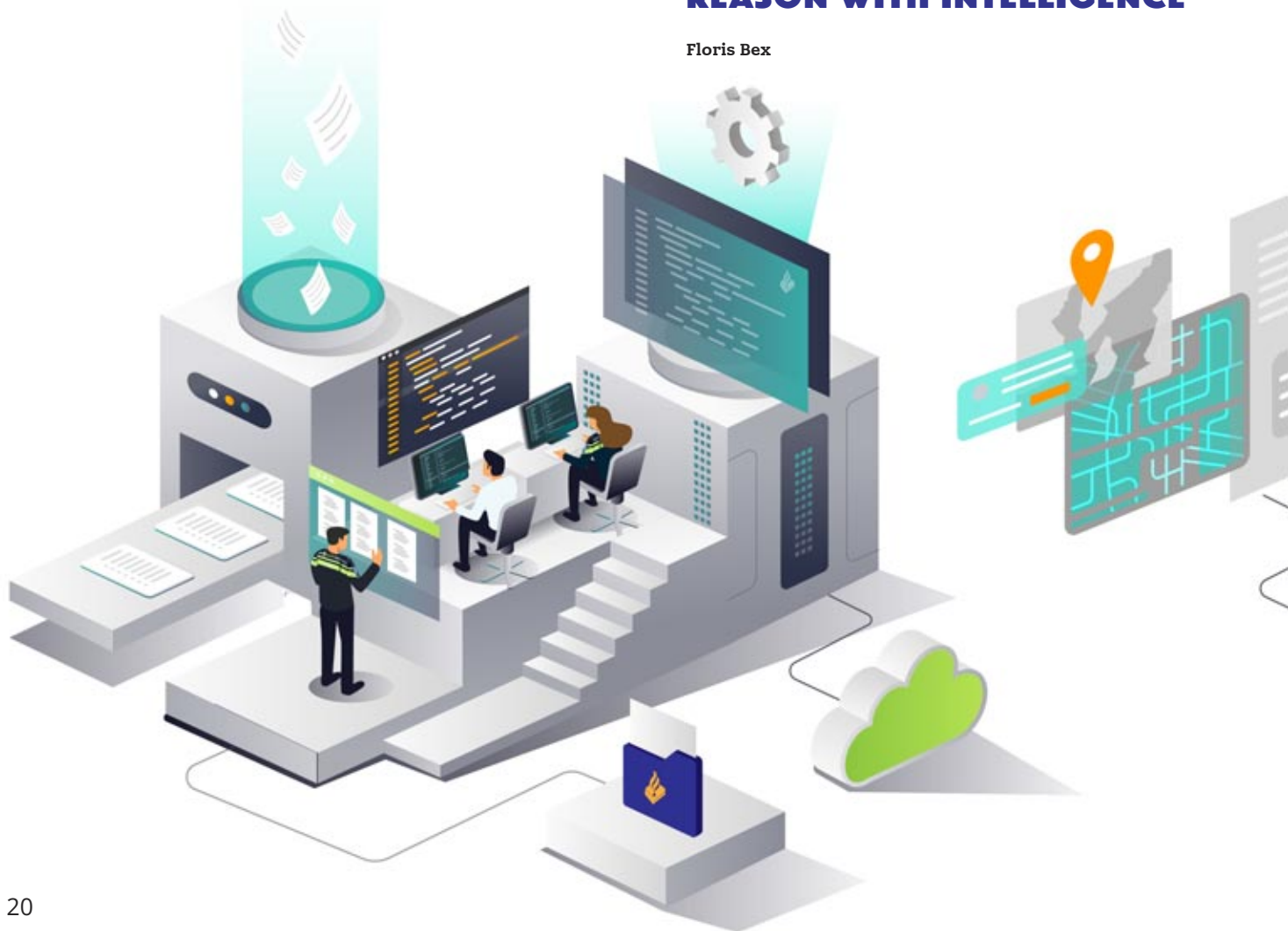
Bex continues: 'There are also PhDs who research machine learning to help sift through massive data sources, to see if such tools would be potentially applicable to digitised evidence sources such as phone or crypto communication data. Another researcher examines visualising these networks to make them understandable to investigators. Furthermore, we take into account the cognitive side: how police analysts reason with intelligence data, since many of them are not trained as data scientists. We have to translate data into actionable insights.'

No flashy technology

Although neither Bex nor Testerink can divulge details about specific cases or investigations in view of privacy regulations, they can state specific methods implemented on the digital work floor of the National Police. 'The aim is always enabling personnel to do their job well with a minimum of tedium,' Bex says. 'For instance, removing people's faces from license plate recognition overview pictures. That used to be done manually, but now an AI model does it so people can do other, more useful things.'

'WE TAKE INTO ACCOUNT HOW POLICE ANALYSTS REASON WITH INTELLIGENCE'

Floris Bex



The same goes for Slimme Keuzehelp (on politie.nl) for fraud complaints, Testerink adds. 'The intake tool reasons about relevant information that might be missing in a report and provides follow-up questions on the spot. This saves time on the police side, which can be directed to solving cases rather than administrative bottlenecks.'

But how about the daily practice of working with AI-based methods? 'The police is not a fail-fast, fail-often type of environment,' Testerink explains. 'AI tools need proper evaluation before deployment and must be inspectable by the police users. It's better to be incremental than to aim for massive disruption.' So no imposing any flashy technology on the workforce, but integrating it into existing workflows. That way it simply feels like a natural extension of an investigator's toolkit. As Bex points out: 'We solve friction. Ideally, an investigator only notices that their search results are better. It's like just another sensor used by the police that makes their work easier.'

Zero-sum game

Initially, there was a big contrast between the NPAI and the National Police. Managing part-time PhDs was difficult, according to Bex. However, the police established a dedicated team that Testerink is part of, which is more closely aligned with operational practice. 'Originally, there was too much focus on having a PhD write a paper and then implementing that exact paper in reality,' Testerink explains. 'Now a student from one of the universities that is doing their research on a topic also

acts as a consultant on these projects to think along, advise us and work on quick prototyping. The entire process is more integrated now.'

Looking to the future, both experts emphasise the importance of managing expectations amidst the current tech hype. Testerink draws a parallel to the car industry: 'About 15 years ago, everyone was convinced that full autonomous driving would be achievable everywhere in a few years. Yet, we still don't have it. I believe that AI in policing is a bit like that; it is not obvious how much our models can do in 5 or 20 years. That is why we need to continue doing research to establish exactly what we can and cannot do.'

Bex concludes: 'I do not expect to see fundamental changes, just gradual ones. The police need to become more efficient because they are dealing with a zero-sum game as both crime and the volume of data keep growing.'

'IT'S BETTER TO BE INCREMENTAL THAN TO AIM FOR MASSIVE DISRUPTION'

Bas Testerink



HAMMERING A JOINT MESSAGE

During the 12th Dutch national symposium on software engineering last May, the VEReniging Software Engineering Nederland VERSEN celebrated its tenth anniversary. The association, which joins IPN's Special Interest Group meetings as an independent society, unites researchers and educators in software engineering. Together, the researchers advance the field, acquire funding, and transfer academic results to society.

By Sonja Knols



'Although we were pursuing the same goals, ten years ago there was still little mutual understanding'

Jurgén Vinju

VERSEN emerged from the annual software engineering symposium SEN (Software Engineering Nederland), which has been held since 2014, explains Jurgén Vinju. The senior researcher at CWI is one of VERSEN's founders and has been on its board since its launch. 'The SEN symposium started out as an initiative funded and organised by CWI. After a couple of years, we decided that it would be good to invite other organisations to get involved as well, to foster greater cohesion and mutual understanding within the field. That marked the start of VERSEN.'

Vinju says VERSEN's primary goal was to increase the visibility of software engineering research, both inside and outside academia. That started by uniting the field. 'Software engineering is a very broad subject. It's not just about programming, but also about sociology, psychology, and fundamental mathematics. Although we were pursuing the same goals, ten years ago there was still little mutual understanding.'

Bottom-up organisation

What makes VERSEN different from Special Interest Groups of IPN, is that it is an independent association with its own budget, supplied by all universities involved and CWI. 'That budget allows us to facilitate bottom-up ideas; as a result of this approach, working groups spring up and then disappear again when they have reached their goals', says Vinju. That resonates with the initial idea that there should be no hierarchy, but instead the field should organise itself from the

HOME

bottom up. 'You don't have to be a professor to become a member of VERSEN or to take on an administrative role in it', Vinju emphasises.

When asked, he mentions some of the milestones the organisation has reached over the years: 'The first time the SEN symposium was not organised by CWI. The Software Manifesto we issued in 2020, in which we sketched the Dutch research landscape in this field, and agreed upon the direction we wanted to take. The fact that we've had parliamentary groups and journalists approach us to learn more about the field. And the NWO call in the making that is fully dedicated to software engineering.'

Current chair of VERSEN, Tanja Vos, Professor of Software Engineering and Testing at Open University and at the Universitat Politècnica de València in Spain, fully agrees with Vinju's list. 'We started VERSEN to raise awareness: What is software engineering? Why is it important? And why is more funding needed for fundamental research in this field? That resulted in the writing of the Software Manifesto.'

Concrete document

That manifesto ultimately led to 'Software technologies and computing' being mentioned as one of the key enabling technologies in the National Technology Strategy. This set the stage for the current KIC call on Software Sovereignty, which Vos is setting up with Tijs van der Storm. 'With that concrete document in hand, we reached out to all relevant stakeholders, ranging from NWO and university executive boards to the former Top Sector ICT (now Digital Holland). Thanks to this manifesto, we could convey the same message everywhere.'

But with this success, the mission is not complete, Vos emphasises. 'Now that the message has been heard in the Netherlands, we want to expand our arena. We have joined forces with other national software engineering associations and research groups across Europe to draft a European strategic research and innovation agenda. In addition to this, we've set up our own working groups at ERCIM (the European Research Consortium for Informatics and Mathematics) and Informatics Europe to bring people together and get everyone on the same page. The message we're sending to the European Commission is that as a field, we know exactly what needs to be done to ensure Europe does



'If you want to achieve something as a field, be bold'

Tanja Vos

not fall behind. And for the research community, our goal is to secure funding for a large-scale European programme in the field of software engineering.'

National point of contact

Another ambition Vos is pursuing for VERSEN, is to become industry's national point of contact for software innovation. 'When I took office as chair, I revitalised our Industrial Advisory Board. If we want to be heard, our message must be consistent. Not only from an academic but also from a business point of view. VERSEN is a network organisation that can serve as a point of contact for companies seeking specific expertise, and for individual researchers looking for companies to collaborate with. There is untapped potential for growth here.'

From her experience with VERSEN, Vos has some heartfelt advice for IPN's Special Interest Groups: 'If you want to achieve something as a field, be bold. Make some noise and say out loud what you need instead of waiting until you're asked. If people don't know you exist, they won't ask you for your opinion.'

Vinju concludes: 'As we celebrate our tenth anniversary, the SEN symposium is and remains our flagship event. Coming together every year is something we all look forward to. What's more: organising the programme gives rising stars the opportunity to put themselves in the spotlight. This constant rejuvenation ensures our community remains agile and able to seize new opportunities.'



Menno Rasch studied Computer Science and Philosophy at the University of Utrecht. He previously managed the IT team at the KNAW Humanities Cluster. On 1 May, 2026 he became the new director of the Netherlands eScience Center.

SPACE TO EXPERIMENT

By Marysa van den Berg Image Ivar Pel

According to Menno Rasch, the new director of the Netherlands eScience Center, IT professionals are the linchpin of modern research. He shares his thoughts on team science, sustainability, and the freedom to innovate.

'What drew me to the Netherlands eScience Center was the opportunity to work with exceptional people at the very forefront of technical innovation. It is the perfect place to push technological boundaries.

At the core of that innovation is a philosophy I deeply believe in: team science. Gone are the days when individual researchers could do science by themselves. You always need a team, and you need a research software engineer in your team. I am convinced that their value goes way beyond their role as support staff. Actually, they are the key to success.'

Sustainable software

The eScience Center can play a role in making this happen. But first we want to improve our relationship with computer scientists in the Netherlands. Nowadays, computer scientists often build innovative software just to test a new concept. They rarely build software with the intention of making it reusable for others.

That is exactly where we can make a difference. The eScience Center possesses expertise in making software truly sustainable, which is possible if you build a community around it. By applying open standards and common tools, we can ensure that the valuable research code remains accessible after a developer leaves, instead of gathering dust.'

Space to explore

'We are living in exciting times, driven by hard data and AI. But this also poses major challenges, such as our growing reliance on Big Tech. We have to be modest, of course; with around 70 people working at the eScience Centre, we cannot compete with Big Tech companies. But making our software open and reusable is a first step toward ensuring that the research sector becomes independent.

To maintain that independent edge, we need room to breathe. Many of our projects are exploratory, which requires the freedom to experiment and figure out what is technically possible. That is why we deliberately keep our projects agile, with no rigid, pre-defined goals.

However, the tension between innovation and institutional reality remains. Funders rightfully want to see clear results. However, we simply do not always know the outcome in advance. It is a daily balancing act, but embracing that space to experiment is what the eScience Center is all about.'