

High-tech meets agri-food

WUR and Eindhoven collaborating more and more | **p.12** |

Voyage of discovery

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RESOURCE [EN]

For everyone at Wageningen University

no 18 – 23 May 2019 – 13th Volume

Lost and found?

'So much stuff gets left behind, it's incredible'
p.16

**INTERNATIONAL
EDITION**




Els + SelfCookingCenter

WUR employees use a very wide range of machines. This time we talk to research dietician Els Siebelink of the Agrotechnology & Food Sciences Group (AFSG).



COOKING FOR TEST SUBJECTS

Just adding or removing one ingredient can sometimes make a world of difference. Els Siebelink knows all about that. She uses the advanced equipment in the Helix research kitchen to make meals for nutrition research carried out by Wageningen Food & Biobased Research and various chair groups. Els: 'I enjoy cooking and I also encourage the participants to stay in the study. That is a real motivating force. Sometimes I have to cook for 60 participants. Every time I manage that — with different versions of the dishes — I realize what a great job I have.'  WA, photo WUR

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HEAR SOME DIFFERENT OPINIONS

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The better you understand what CRISPR-Cas is, the more enthusiastic you will be about this technique's potential as an answer to disease, pests, drought and salinization in agriculture. Last week, WUR CRISPR pioneer John van der Oost was playing in front of a home crowd in the *Resource* debate on CRISPR-Cas in Impulse, which drew an audience of over 100 people. That is because many Wageningen students and PhD candidates share his enthusiasm and can't understand why the organic sector prefers the crude methods of traditional plant breeding to the precise snips of CRISPR-Cas. Debate moderator Ernst van den Ende commented that it would have been a very different discussion in Amsterdam, where people are convinced that CRISPR-Cas is the latest toy of technocrats determined to destroy our ecosystem. Fortunately Michelle Habets of the Rathenau Institute did voice such criticisms. Wageningen is a bubble, as is Amsterdam. That is partly why *Resource* has started organizing debates (p. 7). Time to hear some different opinions.

Albert Sikkema, editor



>> Bedbugs, doggy love or anti-cancer broccoli? A round-up of the more noteworthy stories in international science | p.26

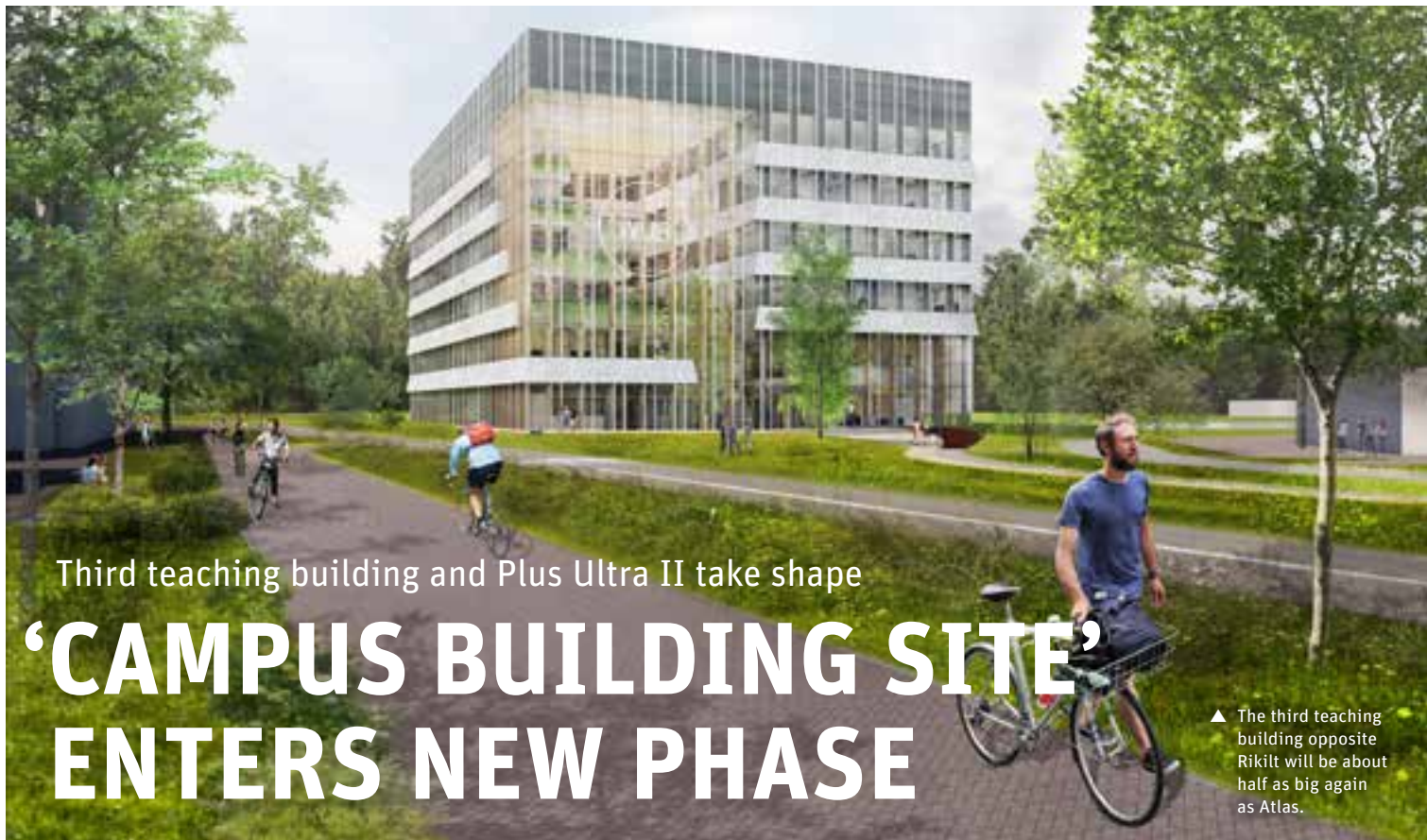


ILLUSTRATION: LIAG ARCHITECTS

Third teaching building and Plus Ultra II take shape 'CAMPUS BUILDING SITE' ENTERS NEW PHASE

▲ The third teaching building opposite Rikilt will be about half as big again as Atlas.

While builders add the finishing touches to Unilever's innovation centre, the long-awaited construction of Plus Ultra II has started on the plot next door. After the summer, the proverbial ground will be broken opposite Rikilt as work starts on the third teaching building.

Plus Ultra II follows on from Plus Ultra I, which opened in 2015. Both buildings, which are for 'start-ups and growing businesses', have been developed by Kadans Science Partner. With a floor area of 10,500 m², Plus Ultra II is almost half as big again as its predecessor. The building will have one storey less but will be longer and wider. There will be a garage for cars behind the new building.

FOOTBRIDGE

The new multi-tenant commercial building will be diagonally behind Plus Ultra I, with a footbridge on the first floor connecting the two buildings. There will be a meeting area in the footbridge. Plus Ultra II was designed by the Proof of the Sum firm of architects. The new building is expected to be finished in a year's time.

Plus Ultra II's first tenant is already known: WUR's StartHub. This hub for new student companies was until recently housed in Triton, the low building opposite Rikilt. This is the site of the planned third educational building. StartHub is now temporarily located on the

ground floor of Atlas and will eventually move to the ground floor of Plus Ultra II. Another prospective Plus Ultra II tenant is the new research centre OnePlanet, a collaborative venture between WUR, Imec in Belgium and Radboud University in Nijmegen.

SIX STOREYS

Construction work on the third teaching building (after the Forum and Orion) will start in September. The edifice, which was designed by architecture firm LIAG, will have a floor area of 17,500 m², making it more than half as big again as Atlas. That is much larger than was envisaged a year ago. The original plan was to divide the construction into three phases. The first two phases have now been merged.

Education & Student Affairs manager Frank Bakema says this change was prompted by the lack of thesis work space among the various science groups. 'By moving teaching rooms used by the science groups to the third educational building, we can create more space for thesis students,' says Bakema.

With six storeys, the third educational building will not be nearly as tall as the Forum. The building will have one large lecture hall, but apart from that will consist mainly of classrooms for practicals. There will be two rooms for experimenting with new teaching methods. Another new feature is the 'canteen' in the form of a food plaza with different caterers.

Demolition work started this week on Triton, to make way for the new teaching building. The construction company for the new building will be announced at the end of June, so that they can start straight after the summer. The building can then be occupied in September 2021. **IK RK**



ILLUSTRATION: PROOF OF THE SUM ARCHITECTS

▲ PlusUltra II will be diagonally behind Plus Ultra I. The two buildings will be connected by a footbridge.

'MORE CASH FOR SCIENCE & TECHNOLOGY'

University funding needs to be less dependent on student numbers, and science and technology courses should get a greater share of the budget.

The Advisory Commission on Funding for Higher Education and Research (the Van Rijn Commission) writes this in its report *Wissels om*. Its recommendations would give Wageningen University an extra 2.5 per cent, or 5.5 million euros, over the next few years.

The report concludes that the quality of higher education in the Netherlands is good but that high standard cannot be maintained much longer. Students and lecturers feel increasing pressure and the student-based funding is a perverse incentive that promotes

unlimited growth. That needs to change fast, says the commission. Starting in 2020, the fixed portion of the funding for education should be increased and the student-related portion reduced. For academic universities, this would involve a reallocation of 300 million euros.

A controversial aspect is the recommendation to give most of this money — 250 million — to universities offering 'science and technical degrees'. This is on condition that they collaborate more.

Education minister Van Engelshoven is impressed with the report. She will be fighting for a bigger budget for education so that the recommendations can be implemented without depriving other institutions. **HOP**

IN BRIEF

>> TRASH RUN 144 kilos of waste collected

Cans, candy and sandwich wrappers, and plastic bottles. Nearly 144 kilos of such 'snack trash' was picked off the streets on Thursday evening 16 May during Wageningen's second Trash Run. The litter-clearing competition attracted 39 participants, slightly more than the first edition in 2017. They were divided into four teams, who took four different 5.3-kilometre routes, starting at De Bongerd sports hall and crossing the campus and town. The prescient team that called itself 'The Winners' won the event. They collected 42 kilos of rubbish — an average of 4.2 per person. The participants found it striking that most litter was 'snack trash' and that the campus was relatively clean compared with the surrounding area. The Trash Run is an initiative of Wageningen Schoon, with support from

Wageningen municipality, athletics club Pallas '67 and student athletics club Tartlétos. **LdK**

>> INNOVATION PRIZE WUR project in Ethiopia

The Wageningen project 'Innovation Mapping for Food Security' (IM4FS) has won the Olam Prize, established by the Olam Group and the French Agropolis Foundation. The prize was awarded to the Ethiopian project manager Eyasu Elias and Wageningen Environmental Research researcher Tomaso Ceccarelli. They received a cheque for 75,000 euros. IM4FS developed a simulation program that lets farmers, regional officials, food companies and banks see which measures will increase production and incomes. The project is also ensuring that 80 best practices from previous projects can be used by regional extension services in Ethiopia. The Wageningen researchers developed this material in partnership with Ethiopian researchers and agricultural extension workers. **AS**

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Bananakiller447

For a moment, I thought I had a scoop. I had just got an email saying that the caterer in one of the university buildings was no longer giving a discount to customers who brought their own cups for hot drinks. That discount was introduced 18 months ago by all the caterers for sustainability reasons. It was suggested perhaps I could write about that.

I'd never got an email like this before. And it was anonymous too. At least, I am assuming Bananakiller447 is not someone's real name. Whatever — the reader is always king and I was getting dangerously close to the deadline for this column. Of course I could write about that!

'Now we're even being diddled out of our little sustainability discount'

I could totally picture it. In the very month in which universities had been exposed as socially unsafe working environments and the Dutch government had announced it would be increasing the interest rate on student loans, we were even being diddled out of our little sustainability discount. Now there would be a mass protest with everyone defecting with their stained mugs to the buildings where you were still rewarded for reuse. A scandal in the making.

Nothing could be further from the truth. I went to the building in question and got the usual discount. Several coffees later, it was clear that the scheme was still in effect in the other buildings too. What, then, was Bananakiller447 going on about? He — I suspect it's a he — has not yet replied to the email in which I put this question, and I doubt whether he ever will. So we will never know.

The caterers have been warned at any rate: their discount policy is being closely monitored. **B**

Vincent Oostvogels (22) is exploring the delicate interface between nature management and food production through his two Master's programmes, Forest and Nature Conservation and Animal Sciences



◀ Trash Run participants pick up litter on campus.

CEO ERIK FYRWALD ON APPOINTING LOUISE FRESCO

‘SYNGENTA WANTS TO BE CHALLENGED’

Erik Fyrwald, boss of the chemicals and seed company Syngenta, asked Louise Fresco to become an independent, non-executive director of his company.

Why? ‘We want to be challenged. Louise Fresco is an independent thinker and an expert on food who will definitely hold up a mirror to us.’

Resource spoke to Fyrwald on 15 May on the sidelines of the F&A Next event in Wageningen. It was DSM boss Feike Sijbesma, an acquaintance of both, who suggested Fresco to the CEO. He visited Fresco on Wageningen campus a year ago for an initial chat. She wanted time to think about it and asked for more information, but decided to accept the offer at the

higher yields for farmers, but its mission has now become much broader. These days, Syngenta also needs to play a role in combating further deforestation and climate change, reducing the use of water in agriculture, improving soil fertility and curbing the use of pesticides.

That means Syngenta plans to sell lower volumes of crop protection agents that are more effective and therefore add ‘more value for our growers’. The company also wants to sell more organic crop protection products and provide more services, for example in the form of precision agriculture with targeted, precise spraying. ‘The volume of crop protection products will continue to decline,’ predicts Fyrwald. ‘We need a lot

‘A key goal is to increase production and reduce emissions’

start of this year. Fresco already briefly explained her Syngenta appointment in a press release and in *Resource*.

Syngenta is in transition, says Fyrwald. Up to a few years ago, the company’s focus in the sale of seed and crop protection agents was on

of research so that we can make better, safer products.’

Fyrwald is looking for new partners to make the food sector more sustainable. For example, he wants to collaborate with supermarkets to agree on the criteria they set for sustainable food. He sees organic



PHOTO: GUY ACKERMANS

▲ Syngenta boss Erik Fyrwald says the company is in transition and Louise Fresco can help by ‘holding up a mirror’.

farming as a big marketing success but believes a more sustainable form of agriculture is possible that has lower greenhouse gas emissions and uses less water than organic agriculture. Syngenta wants to be part of such a food label through its seeds, organic crop protection products, services and data communication. Fyrwald: ‘A key goal is to increase production and reduce the emission of greenhouse gases on every farm.’

Critics say companies such as Syngenta share responsibility for

the environmental harm caused by mainstream agriculture and have not as yet developed any varieties that spare the environment. Do they have a point? Fyrwald points to a new drought-resistant maize variety developed by Syngenta. ‘We now know maize DNA and we know which genes are responsible for drought tolerance, for example. We have a lot more knowledge than 20 years ago, which means we can develop plants that are more sustainable or resistant to disease.’

AS

WUR SANDCASTLE

Wageningen doesn’t have a castle, otherwise sculptor Molhana van den Kroonenberg would have used that as her example. But this one isn’t bad either. It is Slangenburgh Castle, a retreat in Doetinchem that Van den Kroonenberg often visits for her work. The construction of the sandcastle near the Forum entrance is the opening act in Studium Generale’s sand week. Society’s craving for sand, which is threatening the environment, will be discussed in lectures, films and performances. Incidentally, ‘angular’ river sand that sticks together easily was used for the castle. If the weather is not too dry, the sandcastle could stand for weeks. RK



PHOTO: GUY ACKERMANS

CLIMATE MARCH GROUP DISAPPOINTED IN WUR

During a climate march from the campus to the town hall, the campaign group Extinction Rebellion (XR) handed a ‘package of demands’ to the municipality and university. The municipality is prepared to work with the group but the university is not. Which has disappointed the campaigners.

Malik Dasoo (24) and Janina Fraas (22), both WUR students and XR representatives, say between 150 and 200 people joined the climate march on Friday 17 May. The protest included the presentation of symbolic demands to WUR and the municipality.

‘The municipality gave a really positive response,’ says Dasoo. ‘Councillor De Brito said she wants to work with us to persuade national politicians to declare a climate emergency.’ But the campaigners are less impressed with the university’s response. Dasoo: ‘It boiled down to

WUR saying it already did enough because they share information about climate change and species extinction on the website. We don’t see that as “doing enough”.’ Fraas: ‘This university has such a good reputation that it would send a really powerful message if WUR adopted a firm position.’

The campaigners now know ‘what they need to do,’ says Dasoo. ‘The uni-

‘We will be organizing more disruptive protests’

versity has rejected our offer so we will start more disruptive protests to make sure the Executive Board makes an offer to us.’ XR wants to do this in a constructive manner. ‘We won’t be in-



PHOTO: XR

▲ On Friday, Extinction Rebellion campaigners marched from campus to Wageningen town hall. Malik Dasoo is on the right.

terrupting lectures. We will be occupying public spaces and organizing lectures there about climate change and the extinction of species.’ **LB LZ**

END IS NIGH FOR ALUMNI SOCIETY KLV

Alumni society KLV wants to shut up shop. The reason: steadily falling membership numbers. ‘We are no longer engaging substantial numbers of young alumni, and neither is KLV in the picture among the expanding group of international alumni.’

In the past year, the Wageningen alumni club’s board and members have discussed scenarios for the future. ‘Our conclusion is that we basically lack the backing for continuing with KLV,’ says chair Han Swinkels.

The 130-year-old alumni society has 7500 members. Half of the members,

overwhelmingly older alumni, pay a membership fee. The other half consists of recent graduates and students who pay little or nothing in fees. Over the past 10 years, the society has lost about 2000 paying members.

‘Our conclusion is that there is no backing’

The KLV board has used interviews and focus group discussions over the past 12 months to gauge the opinion of members. ‘Older members use their membership to demonstrate their loyalty to Wageningen

University,’ says Swinkels. ‘Younger graduates and international alumni say they don’t need KLV for that.’

That is partly because the demand for KLV’s services for members has waned in recent years. For example, KLV Professional Match for career development ceased its activities at the start of this year. KLV’s added value with respect to University Fund Wageningen, which organizes activities through WUR for all alumni, has also declined.

KLV does still have 14 active study groups. The board is investigating whether University Fund Wageningen can take over the support for these groups. **AS**



PHOTO: ALDO ALLESSE

Is CRISPR-Cas safe?

Jan Willem Erisman shares his opinion about CRISPR-Cas with a full house in Impulse. On 20 May, the Louis Bolk Institute director discussed the safety of the new technique with Michelle Habets of the Rathenau Institute (next to Erisman) and WUR professor John van der Oost (right). In the debate organized by *Resource*, Erisman argued that he wanted to stick to classic plant breeding for organic farming as that is a natural process. However Van der Oost said CRISPR-Cas is the safer option. Habets advocated a broad public assessment of new plant breeding techniques. For more on this debate, see the next issue of *Resource*. **AS**



'GET AWAY FROM FOCUS ON WEIGHT'

The younger children are when you start treating them for overweight, the higher the chances of success. And the emphasis should lie on wellbeing and lifestyle, not on losing weight.

This conclusion was drawn by Laila van der Heijden, a paediatrician and a PhD candidate at Human Nutrition. She studied the effect of three treatment programmes for overweight children.

They worked best with younger children. Keeping it up proved difficult: one third of the young children and 41 per cent of the teenagers involved dropped out, mainly due to lack of motivation.

The treatment of overweight children tends to concentrate on their excess weight and its medical consequences, says Van der Heijden. 'We want to get away from that. There are usually underlying psychosocial problems, such as problems at school or in the family. So treating overweight requires a multidisciplinary approach, in which we look at aspects such as behaviour, diet, exercise levels and self-image. If a child doesn't lose a kilo but does feel happier, that's beneficial in itself.' **TL**



JEANS MADE OF TOMATO PLANTS

The new personal professor Luisa Trindade breeds crops for the biobased economy. With 'no waste' as her motto, she wants to create clothing out of pepper and tomato plants, for example.

'Today's crops were bred for food production, not for the biobased economy,' says Trindade, personal professor at Plant Breeding. She wants to develop plants of which all the different parts can be processed into food, useful articles or raw materials. 'I see plants as little factories for ingredients such as proteins, sugars and oils. You can make products out of those components.'

Trindade's group, part of the Laboratory of Plant Breeding, is made up of about 20 researchers. Together with a plant-breeding company, the team has already developed three new varieties of hemp for producing textiles. 'But we are not there yet. The yield needs to go up and the extraction of the fibres needs to be made

'I see plants as little factories'

easier. And we might be able to get salad oil out of the hemp plant too, and cannabinoids for pharmaceutical applications.' To facilitate such applications, Trindade is currently running a trial with 125 different hemp varieties.

Her group is also doing research on *Mis-*

canthus, an East-Asian grass variety that is suitable biomass for making paper, insulation material and bioplastics. Eventually, Trindade wants to make an improved variety that combines a high yield with better digestibility, making it suitable for bio-ethanol.

Last but not least, the new professor wants to adapt food crops such as tomatoes and cucumbers so that the leaves and stalks can also be used. There are many proteins and fibres in these plants, says Trindade, so you could also make jeans out of tomato fibres. And the crops produce substances that protect the plant from moulds. She wants to find out whether these could be used as preservatives or as organic pesticides.' **AS**



▲ Luisa Trindade measures the height of *Miscanthus*, an East-Asian grass variety which her team is experimenting with.

PHOTO: WUR

GUT FLORA INFLUENCES RISK OF ALLERGY

The composition of the gut flora of infants when they switch from liquids to solids affects the development of allergies. This finding comes from the PhD research of Harm Wopereis in the Laboratory of Microbiology.

In healthy babies who are breastfed, the intestinal microbiome (commonly known as gut flora) largely consists of *Bifidobacteria* in the first few months. That creates an acidic intestinal environment. Once the baby moves onto solids, the population becomes more diverse and gradually starts to look like the microbiome of an adult.

Breast milk contains indigestible sugars that serve as food for the *Bifidobacteria*. That is

why a lot of infant formula has for the past 20 years contained fibres aimed at encouraging *Bifidobacteria* in the intestines. These so-called prebiotics are also combined with live *Bifidobacteria* (probiotics). Wopereis investigated the effects of prebiotics and synbiotics (prebiotics plus probiotics) on the intestinal microbiomes of children with a predisposition to allergy or who were allergic to cow's milk.

He found that adding prebiotics and synbiotics creates an intestinal microbiome that is closer to that of children who are breastfed. He also discovered that a strongly acidic intestinal environment is good for the bacteria that follow the *Bifidobacteria*, which

convert the acids into butyrate. These bacteria — including the genera *Anaerostipes* and *Eubacterium* — may also provide protection against eczema. 'These groups of bacteria were less prevalent in children who developed eczema during the shift to solids,' says Wopereis. The transition to more diverse gut flora also went less well in this group.

In experiments with faecal transplants in mice, Wopereis demonstrated that the bifidogenic environment is indeed a determining factor in the protection against allergies. The IgE level increased in mice that were given poo from children with an allergy to cow's milk. 'That level is the most important immune factor in allergic reactions.' **AJ**

Where can we put all those solar panels in the Netherlands?

‘IN THEORY, THERE’S ENOUGH SPACE ON ROOFS’

In order to reach our climate targets, a lot more solar farms need to be created in the Netherlands. But where are we to put them in this overfull country? Wageningen Environmental Research has been pondering this sensitive question.

The Dutch are eager to have clean energy. But they don't want it generated in their immediate vicinity. In fact, businesspeople who want to establish wind farms in the north of the Netherlands have been threatened by activists. And even in 'sustainable' Wageningen, plans for solar farms on farmland were met with strong protest.

'Almost everyone is in favour of sustainable energy, but we need to blend it in, both socially and in the landscape,' says Friso van der Zee, one of the researchers at Wageningen Environmental Research who wrote the report 'Solar panels, nature and agriculture' at the behest of the minister of Agriculture, Nature and Food Quality.

You could say: just cover all the roofs with solar panels.

'That's right; that is what most people want. We have 800 square kilometres of roof in the Netherlands and there are currently solar panels on only 40 square kilometres of them. So there is still plenty of potential. Not all roofs are suitable: either the design is inappropriate or they are north-facing. But if 20 per cent are suitable, you get 160 square kilometres.

‘In practice, developers look for places where they can install a lot of panels, on the ground’

Is that enough?

'To reach the cabinet's climate targets we need about 9000 hectares of solar panels by 2030, or 90 square kilometres. So in theory we could put all the solar panels we need in the Netherlands on roofs. But in practice, the developers who make solar farms are looking for places where they can install a large number, on the ground. Last week I was at a zinc factory in Budel where

a solar farm of 60 hectares has been installed. The solar panels are on contaminated ground and the area is tucked away and inaccessible. Nobody has a problem with that; it's fine. Some nice heather even started to grow there and there were lots of skylarks flying among the panels.'

Is farmland suitable?

'Solar panels are indeed being located on farmland now too. Developers approach farmers and calculate how much a solar farm would generate in subsidies. No crop can compete with that. The developer then needs a permit from the municipality or the province. They are starting to set conditions. For example: keep some space between the solar panels so you can combine solar energy with nature management in the form of herb-rich grassland for insects and birds. Thanks to such rules, a solar farm could increase biodiversity in an intensively fertilized agricultural area. But only if you go about it the right way.'

What are the considerations for people starting solar farms?

'People oppose wind farms and solar farms because they affect the landscape. Developers can pre-empt that by involving farmers and local residents at the planning stage. There are also examples where local people can invest and get some of the profits. Then it becomes *their* solar farm.'

Where should the solar farms be located?

'Not in nature areas, because we must look after our biodiversity. You won't get a permit for that, anyway. It varies; you have to go looking for places where it's possible. I saw a solar farm on a former rubbish tip along the A15. Perfect location because you can't do anything else with it. Perhaps you could also combine solar panels with higher water levels in marshy areas to reduce CO₂ emissions. Not on open marshland, because of the openness of the landscape and the field birds, but in more closed landscapes. **AS**



▲ Solar panels on farmland can actually increase biodiversity. 'But only if you go about it the right way.'

PHOTO: SHUTTERSTOCK



BUTTERFLY PAINT NEVER FADES

In future, you may be able to use non-toxic paints and still not have to climb the ladder to paint your window frames so often. Researcher Jessica Clough and her colleagues from Physical Chemistry and Soft Matter have developed a paint that never fades. They found their inspiration in birds, butterflies and beetles.

Colours are usually created by pigments absorbing certain parts of the light and reflecting others. Unfortunately, that is also why colour fades: when light is absorbed, that sets off chemical reactions that break down the pigment.

But there is another way. In butterfly wings and peacock feathers, any light that is not reflected passes straight through instead of being absorbed. This creates a 'photonic colour', which retains its intensity for a very long time. Clough: 'Some insect fossils are just as colourful as they were millions of years ago.'

The researchers managed to reproduce these nanostructures from the animal kingdom in the lab by stacking tiny plastic beads. In between the beads, they put silica, the main constituent of sand. When heated, the plastic beads disappear and the silica hard-

ens. This creates a structure with air pockets where the beads used to be. The size of the beads determines the colour: blue for the smallest beads, then green, and purple for the largest beads.

To date, the researchers can only produce a limited colour range. 'Blue and green work well,' says Clough. 'But structures that reflect red also reflect blue, which gives you purple.' In the future, the researchers hope to remedy

The researchers reproduced nanostructures from the animal kingdom in the lab

this with a mixture of small and large beads. Bright colours also form a challenge, as the beads reflect some white light, creating pastel colours. 'We can suppress that by adding a little charcoal,' says Clough.

The paint is still quite expensive because it is produced in a lab, but Clough believes factory production could bring costs down. She herself has already created some artwork with the new paint. **TL**

WHY DO/DON'T FARMERS INVEST IN WATER MANAGEMENT?



PHOTO: MELLE NIKKELS

Governments and water boards want farmers and market gardeners to contribute to investments in water management. But how can you persuade them to do so? By first exploring their motivations, says PhD candidate Melle Nikkels.

The Netherlands is increasingly suffering both droughts and floods. Changes such as modifications to drainage systems or mini dams in ditches could help make the country more climate-robust. But that would require individual farmers to spend money on their land. In such a situation, farmers weigh up the net benefits for them and look at whether their neighbours are also investing.

Governments usually use grants to encourage such investments, says Nikkels, who is doing his PhD in the Water Resources Management group. But they actually have no idea how an investor's decision-making process goes. 'It may not be the costs that deter-

mine whether a farmer invests; it could be other reasons.'

Nikkels facilitated group discussions in Walcheren, where farmers work together to store fresh water and keep out salt water. 'I discovered that some farmers are prepared or able to pay a lot more for water than others. They are now having to deal with that because they are investing together. If you swap personal expertise and experience, that creates understanding and makes it easier to arrive at joint investments.'

In Australia, Nikkels was involved in a wastewater project that could provide water for farmers. But some farmers were against it. In group discussions, it turned out that they drew up five-year plans and wanted a water price that would be fixed for five years. Nikkels: 'A relatively simple change to the delivery conditions increased their willingness to pay. That would never have worked without those discussions.' **AS**

▲ Melle Nikkels (right) also visited farmers in Australia for his PhD research on collective water management.

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RESOURCE
For everyone at Wageningen University & Research



THE PROPOSITION

‘Wild fathers are good for kids’

Two stair gates? That’s overdoing it! Marije van Doorn-van Atten’s husband is less cautious with their children than she is. She read studies about this phenomenon and came up with the proposition ‘Father’s challenging parenting behaviour leads to less anxious children’. Now she just has to learn how to let go...

‘I have a little girl, Sarah, aged two and a half, and an eight-month-old baby boy, Ruben. Since I’ve had them, I like to read scientific studies about parenting. I didn’t make up this proposition; it was inspired by a study on challenging parenting behaviour that was published last year

in *Behavioural Research and Therapy*. I noticed my husband is a bit wilder than me when he plays with the children. When I see my son hanging upside down, I think: Oh, I hope he doesn’t fall. Whereas I know

‘Fortunately we haven’t ended up in the emergency unit’

that children need to push their boundaries sometimes and you shouldn’t be too protective. The study shows that fathers’ challenging behaviour has a positive effect and



PhD candidates have to include propositions about society at large in their thesis. In this section, they explain their most provocative proposition. This time it is Marije van Doorn-van Atten in the Human Nutrition and Health group, who received her doctorate on 10 May for her research on telemonitoring in care for the elderly.

the children grow up to be less anxious. So you should let fathers mess around with the kids, throw them about or encourage them to climb higher. I find it quite difficult to let go because I am always worrying about the risks. Our youngest is already hurtling around the house and the cacti are not safe. Children are bound to get hurt sooner or later. Fortunately we haven’t yet ended up in the emergency unit. My husband and I do discuss this sometimes. For example, I wanted stair gates at the top and bottom but he thinks that’s overdoing it. Now we just have a gate at the top.’ **TL**

WUR and Eindhoven University are collaborating more and more

High-tech meets agri-food



Wageningen wants to collaborate with more partners, says its strategic plan, and Eindhoven University of Technology is a favourite. Researchers from WUR and Eindhoven are already collaborating on precision agriculture, printed food and plasma technology. And there are a lot more plans in the pipeline.

text Albert Sikkema *illustration* JeRoen Murré

Last week, researchers and directors at WUR and Eindhoven University of Technology (TU/e) presented their plans for making food production in the province of North Brabant more sustainable, working together with HAS University of Applied Sciences and the agricultural organization ZLTO. Within the new Agri-Food Innovation Initiative which was launched officially on 13 May on the Eindhoven campus, researchers are going to put their heads together to see how they can make better use of plant waste, improve the welfare of pigs and further develop

precision agriculture (see inset). ‘The link between WUR and TU Eindhoven on the agri-food and high-tech axis is essential to North Brabant,’ the province writes about the initiative.

HANDS-ON MENTALITY

High-tech and agri-food are joining forces with increasing frequency. And this hasn’t come out of the blue. Three years ago, WUR joined the collaborative federation of the science universities of Delft, Eindhoven and Twente, turning 3TU into 4TU. The favourite collabora-

tion partner for WUR is Eindhoven, a university which focuses its high-tech research on health, energy and mobility, and sees opportunities in the field of agri-food. Two leaders were appointed to explore the scope for collaboration: Ernst van den Ende, director of Wageningen's Plant Sciences group, and Jakob de Vlieg, professor of Applied Data Science at Eindhoven. Asked about the state of play, De Vlieg reels off a long list of joint WUR and TU/e projects. Some have already started, some are about to start and for some, proposals are being submitted (see insets).

'We both have researchers with a hands-on mentality'

There is a lot of contact, especially, between the boards of Eindhoven and Wageningen. That is because there is a lot of common ground between their lines of research, said the Wageningen rector Arthur Mol last year in *Cursor*, TU/e's online magazine. 'Also, our universities are very similarly organized: a lot is left up to the people at the workplace. We don't have researchers with inflated ideas about their own importance; we have people with a hands-on mentality.'

SPEAKING THE SAME LANGUAGE

Things don't always run smoothly, however. Wageningen and Eindhoven collaborate in the Sustainable Food Initiative (SFI), a large consortium of universities and food companies that want to make their production more sustainable. But the approved SFI projects have not started

yet, because the companies have not reached an agreement on who owns the knowledge to be developed. De Vlieg: 'Sometimes we work on big research proposals involving several parties, in which we have to agree on a lot of things in a short time. That can be tricky.'

The biggest issue for the collaboration, according to De Vlieg, is whether the researchers speak the same language. 'We need good interdisciplinary questions,' he says. It is also essential that the researchers appreciate each other's qualities, adds Van den Ende. There have been times when Wageningen Research staff implement a project with TU/e professors who have never done applied research, says Van den Ende. 'Then you need to make good use of each other's competencies.'

De Vlieg has seen the collaboration grow. 'You see, Eindhoven has a lot of expertise in the fields of robotics, sensing technology and artificial intelligence. Wageningen is the best in the world in agri-food. That brings a lot of energy into the collaboration and creates new scientific opportunities. I have seen a big increase in interest in agri-food in Eindhoven, among students as well.'

What are researchers from Eindhoven and WUR working together?
Read about it in the following pages.

What are researchers from Eindhoven and WUR working on together?



GROWING FOOD SUSTAINABLY

Within the new Agri-Food Innovation Initiative, WUR and Eindhoven are going to help the province of North Brabant make food production more sustainable. One of the ways they plan to do this is to research how to make better use of plant waste flows. They will use new extraction and drying techniques to process carrot scrapings into valuable juices, fibres and pectin. That is big business in Brabant, where nearly half the country's carrot crop is grown. The researchers are also going to develop new sensing, visual and data methods for measuring the welfare of pigs. In this project aiming at a 'smart pig chain', they will also

look at the potential for innovative sheds, breeding methods and adapted feeds for improving the animals' health. The aim is to reduce the use of antibiotics and improve the quality of the meat. This is another important issue for the province, where 1600 pig farms rear half of all the pigs in the Netherlands. And a third project focuses on precision agriculture in the potato sector, in the interests of more efficient use of water, nutrients and pesticides. Wageningen and Eindhoven are going to pool expertise in the areas of model development, data interpretation and the design and development of smart machines.

PURIFICATION BY LIGHTNING

Plasmas are ionized gases in an electric field. They are at work in a flash of lightning or in fluorescent tube lighting. The Eindhoven professor Guus Pemen makes plasmas for medical and environmental applications. If, say, you conduct dirty air through a machine which generates little lightning flashes, you get clean air. The professor thinks this could be of use to the agriculture sector and he is now running a pilot project to capture ammonia, fine particles and bacteria in pig sheds using plasma technology. Together with Masja Nierop Groot of Wageningen Food and Biobased Research, he is also running a test to reduce rotting in potatoes in storage by capturing the rotting gas ethylene with plasmas. The technique works in both cases, but it is still much too expensive. Pemen is also working on deriving artificial fertilizer and pesticides from plasma-activated water. If you create mini lightning flashes above a bowl of water, a whirlpool is formed in the water containing all sorts of nitrogen and oxygen free radicals. Under certain conditions, nitrate is then formed – which is artificial fertilizer. Under other conditions, disinfecting compounds are formed which can combat fungal infections. Pemen has tested this plasma water on bell-pepper and strawberry plants at WUR Greenhouse Horticulture in Bleiswijk, and managed to combat fruit rot with it. Pemen has now written an NWO proposal together with WUR, for research on the effect of plasma-activated water on plants. 'I need WUR because I don't know anything about strawberries or microbiology.'

FOOD FROM THE PRINTER

For a year, WUR has been working with TU/e and the Netherlands Organization for Applied Scientific Research TNO on the Digital Food Processing Initiative. Coordinator Katja Pahnke of TU/e: 'Eindhoven is good at printer technology; Wageningen is good at nutrition; TNO is good at development processes. We are working together on research proposals on printed food.' One PhD student is already working on the structure of printed food. You could produce carrots, for example, in the form of a smoothie, suitable for elderly people who have difficulty chewing or swallowing, says Pahnke. Or you could print an appetizing insect burger, or personalize food for people with allergies.



MINI-SPECTROMETER

Plants absorb light of a certain wavelength. Spectrometers can use that fact to measure things like the length of leaves or the sweetness of strawberries. So far, these have been relatively large and pricy pieces of equipment. The Eindhoven professor of Photonics, Andrea Fiore, wants to create a small, cheap chip that can do exactly the same thing, and could be put in a smartphone. Fiore already knows how he can measure light with this kind of microspectrometer, and which filters he can use to convert the different wavelengths into information. What he doesn't know is exactly which wavelengths provide which information about the plant, and how sensitive the filters need to be. He therefore

wants to collaborate with the Wageningen Imaging Spectroscopy Hub (WISH). The collaboration is still in its infancy, but Fiore anticipates doing fundamental research and fieldwork in greenhouses together with WUR.



SPYING ON TURKEYS

Peter de With, expert in computer vision at Eindhoven, is going to do research with the Wageningen animal scientist Piter Bijma. In collaboration with Hendrix Genetics, they want to track the individual behaviour of turkeys in large barns using cameras. To do this,

they need to be able to tell hundreds of individual animals apart. De With developed detection methods for health care, for recognizing tumours, and is now going to see whether his technology can be used in livestock farming too.



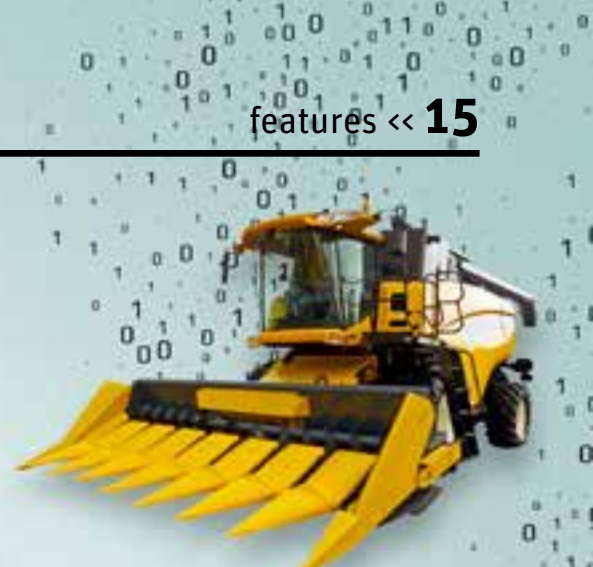
ROBOT PICKS APPLES

Together with other universities, Eindhoven and Wageningen are participating in the NWO programme Flexcraft, in which researchers are developing new robots. The research leader is Professor Eldert van Henten of the Farm Technology group at WUR. Flexcraft has four million euros to spend on robots which do things like pick ripe apples and tomatoes or pack chicken fillets at the abattoir.



ON-FARM MILK PROCESSING

The faculties of Industrial Design and Information Engineering in Eindhoven are keeping each other busy with new concepts for short food supply chains. Examples are an on-farm milk factory for processing milk fully automatically and highly specifically, or personalized milk per cow. The faculties would like to continue developing these concepts in collaboration with Wageningen.



SMART ORGANIC FARMING

WUR and Eindhoven have teamed up with the Universities of Delft and Utrecht to submit a programme proposal called Synergia to the NWO. In this programme, they want to use high-tech in the interests of efficient ecological farming. Concretely, they want to develop robot systems for methods including mixed cropping and strip cultivation. 'We are world leaders in robotics at Eindhoven,' says De Vlieg. 'To get the robots working together, we use a variety of sensing techniques and artificial intelligence. We hope to use this knowledge in arable farming too, for example for targeted weeding and to make mixed cropping economically viable.' Peter Groot Koerkamp, professor of Agro-technology at WUR, took the initiative for this project at the cutting edge where agriculture, horticulture and high-tech meet.





HAVE YOU LOST THIS?

'So much stuff gets left behind by students in the Leeuwenborch. Just incredible. And the strangest thing about it is that no one asks after it,' wrote receptionist Mirjam Rutten in a recent email to *Resource*. She wondered whether we could give it some coverage. So we are doing just that. Are our models Gina and Sam wearing or holding your lost bra, soft toy, gloves, USB stick, sunglasses, multiple socket, woolly hat or photo frame? If they are, go along to Reception at the Leeuwenborch and rescue your possessions. Have you lost something else? Go to ilost.co and use the search terms 'WUR' and your lost item (in Dutch).  LZ, photos Judith Jockel



Physical chemist Joris Sprakel is always exploring new territory

'I can't stand monotony'

Joris Sprakel calls himself 'a creative spouter of ideas'. 'When I've done one thing for a few years, it is time for something new.' This spirit of exploration has brought the 38-year-old physical chemist a successful career, with his appointment as personal professor as the high point so far.

text Tessa Louwerens *photo* Roger Cremers



'I'm thinking of asking for a chainsaw for my birthday because I fancy making ice sculptures'

'You must tell me if I talk too much,' says Joris Sprakel animatedly. He is in his office, playing with a Hoberman Sphere, a brightly coloured mobile globe that constantly changes shape in his active hands. 'Sorry, but I'm not very good at sitting still.'

Sprakel talks about his work with great enthusiasm. He and his colleagues mainly do experimental physics and chemistry research. 'We try to go beyond the current limits to what people can measure.' Ideally, Sprakel likes to be working on 10 things at a time. 'I'm not really a person for the long haul.' This explains his research programme, which he himself describes as 'schizophrenic', and his somewhat circuitous career path.

You started out in food technology.

'To be honest, I hadn't exactly thought that decision through. As a kid, I was a fan of Carl Sagan, the astronomer who presented the *Cosmos* series. So I once spent a day in the Astronomy department in Utrecht. The degree programme appealed to me, but the people were not very sociable. I thought, I won't last five years here. My father suggested I take a look in Wageningen. At the open day, there was a machine that produced an enormous rainbow-coloured cake. Cool! That's actually a very bad reason for choosing a degree course, but I like food and I like technology. I ended up taking seven years to get ►

JORIS SPRAKEL (b. 1980, OSS)

1998-2005	Studied Food Technology at Wageningen
2005-2009	PhD (<i>cum laude</i>) supervised by Jasper van der Gucht (Physical Chemistry and Soft Matter)
2009-2011	Postdoctoral fellow at Harvard University (Boston, US) on a Rubicon grant
2011-2019	Associate professor in the Physical Chemistry and Soft Matter chair group at WUR
2011 and 2017	Veni grant from the Netherlands Organization for Scientific Research (NWO) for research on geckos' sticky feet
2017	Vidi grant from the NWO for research on nanomaterials inspired by nature
March 2019	Appointed personal professor of Physical Chemistry and Soft Matter

Sprakel is on the board of the 4TU federation and the SoftComp Network of Excellence. He is about to start living with his partner, and is the proud uncle of a niece and nephew.

my degree. I can justify one year's delay because I was on the student council. But apart from that, I must admit I was quite lazy in those days. I was a member of Ceres and sometimes I'd just rather drink beer than do any work.'

Then you got your PhD on paint.

'Yes, another switch. When I've done one thing for a few years, I think it's time for something new. I researched how to improve latex paint so that it could serve as a substitute for turpentine paint. Because turpentine is toxic and causes things like psycho-organic syndrome, which attacks the brain. Solvents are also the second biggest source of greenhouse gases in the world. Almost everything around us is varnished: cars, lampposts, packaging. I want my research to make a contribution to society. The science has now reached the point where solvents will be superfluous in a few years. But it is up to the industry to actually apply the techniques we have.'

'I learned a lot at Harvard but I didn't like the US as a country'

After your PhD you were a postdoc at Harvard. Didn't you want to stay there?

'I was offered a contract extension but I wanted to come back to the Netherlands. My father was getting on in years and my sister had two children by that point. I knew by then that I was gay and probably wouldn't have a family myself so I was keen to see my niece and nephew grow up. As well as that, I don't like the United States as a country. It's great for scientists but it's a terribly hard country for anyone who, for whatever reason, doesn't do well in society. That upsets me. I'm too much of a Dutchman who likes it if we look after each other properly. And I thought I was going to research heaven. But what really makes Harvard stand out is the fact that there are a lot of good research groups under one roof. That creates the impression that the quality is outstanding, but you don't have to leave Wageningen to be among the world's top research groups.'

Not a positive experience, then?

'I learned a tremendous amount there. Such as how to write a good article and how to sell research. In the Netherlands, I had absorbed a fairly puritanical take on science: You have to work rigorously and systematically and when you're done, you write it up matter-of-factly. At Harvard I learned to jazz it up a bit, so your work becomes a bit more accessible and gets into better journals. For young scientists aiming at a career, it can help if you get this sales trick under your belt.'

Once you were back in Wageningen you got to professor level pretty fast.

'Tenure track certainly worked out well for me. But I do see people fall by the wayside. There is a strong bias towards certain qualities. Whereas there are also scientists who are fantastic analytically but may have no talent for selling their

research. They don't make it, and I think that is a real pity. It leads to a monoculture, whereas diversity is important. Not just in terms of gender, sexual orientation or ethnicity, but also in terms of personalities.'

Paint, geckos' feet and plants. There's certainly no lack of diversity in your research.

'Haha, yes, I have broad interests. That's why I have such a schizophrenic research programme, too. Paint is still an important line of research. We do research with scientists from the Rijksmuseum on what solvents do to oil paint. Once every 50 years, the layer of varnish is removed in order to clean the painting. But then you want to be sure that you'll only remove that layer, and not the eyeball of one of the soldiers in Rembrandt's *Night Watch*. So far they test whether any paint comes off with a cotton bud, but you're actually too late by then. My PhD student Jesse has made a little gadget with which we can measure precisely where the solvent goes. The second important line of research that we are developing now is about the effect of mechanical forces in plant cells (see inset, ed.).'

What do you like best?

'I find that really very difficult to say. Whether I am in the lab talking to Dolf Weijers about plants or trying to measure cracks in statues in the Rijksmuseum, it's all so nice. I am a creative spouter of ideas, really. It is of course important that the details are worked out, but that is not so much my thing. The advantage is that as an outsider, I often have a fresh angle on topics. The downside is that I'm not really known for one particular thing. So I sometimes get reactions such as: why are you applying for a grant for plant research? Don't you work on paint?'

Those grant applications seem to go pretty well for you. Veni, Vidi... Vici?

'Of course that would be super, but even I don't have a 100 per cent success rate. My financing strategy is a bit of a scattergun approach. And that does go wrong sometimes, and no one hears about those cases. I found those rejections difficult at first. You spend three months writing a proposal and you get nothing. To do this job you need to be able to cope with disappointment. It also makes me keep on pushing myself, and the one time it does work out, it feels great. Writing research proposals also gives me a chance to put my thoughts in order and to dream about my goals.'

'I stimulate my students to approach science with childlike enthusiasm'

What do you dream of then?

'Last year we invested a lot as a group in developing new measuring methods. I would like to make use of those now to answer questions. We are already working on it, in plant research for instance. I want to create space for curiosity-driven, fundamental research. Answering questions is not the



'I have broad interests. That's why I have such a schizophrenic research programme'


same thing as solving problems, which is what you are often doing in contract research. The reality is of course that you need funding for it. I am fairly opportunistic about that and I look out for opportunities for it. I don't have a whole strategy worked out for the next five years.'

You've made quite a splash as a teacher too. You have twice won a WUR Excellent Education Award. What is your secret?

'Children ask "why?" a hundred times a day. Then our education system does its best to knock that out of them. It makes you a nuisance. I try and stimulate my students to approach science with childlike enthusiasm and spontaneity. Science is cool and you can discover new things all the time. I think it's fantastic when a PhD student storms into my office because he's discovered something amazing. Then we try and figure out together what on earth is going on. I can't stand

monotony; there's got to be some excitement.'

So are you a daredevil?

'Haha, no, far from it. Outside my work I'm quite boring really. I love going to a museum with my partner or going for a walk on the beach or in the woods. That has a calming effect on me. There's actually always a circus going on in my head, day and night. I calm down in the woods. But I do all sorts of different things in my spare time too. Painting, woodwork, playing the trumpet – I've done all of those. When my partner and I met a year and a half ago I was convinced that ceramics was my passion. I even bought an oven for it. Now we are going to live together and I've just bought an artist's easel. I can see him laughing already. He knows it will be on an online marketplace in six months. I'm thinking of asking for a chainsaw for my birthday because I fancy having a go at making ice sculptures.' 

MINI-FORCES IN PLANT CELLS

The latest branch of Joris Sprakel's scientific tree is mechanobiology. He and his colleagues are studying how biological systems react to mechanical forces such as pressure. Hardly anything is known about this because the forces are so tiny that researchers could not measure their effects at cell level. Sprakel: 'We are now developing sensors that can measure those small forces, using molecules that change colour under pressure, for example.'

The aim of the study is to understand why biological systems get stronger when exposed to mechanical force. 'If you exercise muscles, they get stronger. But synthetic materials get weaker if you expose them to forces. I want to know how that works, and to do that I have to be able to measure what is happening first. Eventually we can use that knowledge to make sustainable synthetic materials, such as a car tyre that gets stronger the more you drive on it, or paint that never fades.'

CAMPUS OF THE FUTURE

Glass tree huts, heat sensors under your desk, outdoor workstations and a flexible meditation and slumber corner. At the invitation of WUR Facilities & Services, student teams spent last Friday on an 'Invention Summer Camp' coming up with out-of-the-box ideas for tackling the lack of space on campus. Six teams present their solutions here.

text Tessa Louwerens and Luuk Zegers *photos* Judith Jockel

Rio Alfajri (24)



Master's student of International Development, team Brainsharing Corner

'Our idea is to bring students together by allowing them to share their knowledge. They can do this through a social media app that we call Brainsharing. Students can use the app to ask for help on certain topics, like statistics. The app matches them with other students who have filled in 'statistics' as an expertise. **If an expert agrees to help the student who made the request, they can meet in the Brainsharing Corner in the Forum.** We want to encourage participants by awarding points for helping fellow students. These points can be exchanged for rewards such as extra ECTS credits or gifts.'

Sarah van Kooten (20)



Bachelor's student of Landscape Architecture & Spatial Planning, team The Trees are the Limit

'Students often suffer from stress, which leads to physical and mental problems. We know that nature reduces stress. WUR is already working on this, but it is mainly bringing nature to the people, for example by placing indoor plants. We have come up with a concept that brings people to nature. **Our idea is to have a self-sufficient glass tree hut centred on a cluster of trees.** High in the tree hut are places where you can study quietly. Lower down is more room for meeting up, and there is a community garden on the ground floor. At present, trees often have to make way for buildings but you can also embrace the trees.'

Meyke Kamstra (21)



Bachelor's student of Management, Economics & Consumer Studies, team WUR to Go

'We focused on two problems: the lack of study areas and the inefficient use of classrooms. **We propose that new educational buildings should be designed as multifunctional spaces.** For example, lecture rooms where you can move the chairs and tables and put up walls, converting them into quiet areas or rooms for group work. We reckon you could use artificial intelligence and big data to work out what kinds of space are needed at what times. Big data would even let you give personal tips. For example, an app on your phone could register when you are cycling over the Forum bridge and show you where you can find a free workstation.'

'High in the tree hut are places where you can study quietly'

Floor Boonstra (22)



Bachelor's student of Health & Society, team Seat Yourself

'Our team came up with an idea for reducing the crush in the Forum library during revision and exam weeks by making more effective use of the library. **The problem is that students often**



◀ Campus is getting more and more crowded. Students are helping WUR find creative solutions for the lack of space.

leave a jacket on a chair to reserve the seat while they go off to play sports or eat. We propose putting heat sensors under the tables to measure body heat. If someone has been away from their desk for more than half an hour, a green light will come on and someone else can sit there. If the original occupant's things are still there, you put them in a special cupboard. The idea is that students will then make more effective use of their breaks. The workstations will get a QR code that you can scan, so that you get an alert via an app when your half hour is nearly up. The same app will also show you how many workstations are still available.'

Sergi Domenech-Carbo (24)



Master's student of Organic Agriculture, team Flexi-Space

'There is no place on campus to rest or relax, whereas we really need this. We want to create a space with attention for mind, body and heart — three parts of ourselves that need attention. We envision a big, flexible space with movable walls that can be transformed for different purposes. **For the mind, we want a place to relax, meditate, sleep and rest.** For the body we want an active place, for yoga or dance lessons for instance. And for the heart, we want a place where


'We want outdoor workstations, shielded by hedges'

you can connect with each other and share your feelings. Our Flexi-Space could for example be incorporated in the new educational building.'

Bernice Wesselink (22)



Master's student of Communication, Health & Life Sciences, team Inside Out

'If the weather is nice, a lot of people go outside and sit on the grass. Great for chillaxing but you can't work there. At the same time, we have a shortage of workstations. **Our idea is to create outdoor workstations.** Hedges in a honeycomb formation will separate the areas off and provide shade. There will be all-weather tables and chairs while a roof covered in solar panels will provide electricity for the laptops and keep off the rain. The beauty of our idea is that we make smart use of the limited space on campus. The downside is that these spots can only be used in summer.' 

Master's students win prize for their consultancy project

ACT stars

On the Academic Consultancy Training (ACT) course, Wageningen Master's students tackle real problems for real clients in teams. Now there is a prize for the best ACT project, and this is the first team to win it.

text Luuk Zegers photos Guy Ackermans

At the beginning of this academic year, a team of six Master's students came together to find an answer to the question 'Is it possible to run an agroforestry farm in a water catchment area in a way that is cost-effective for the farmer without threatening the quality or quantity of the water?'

The students worked on answering this question fulltime for two months. They did so well that on Monday 13 May they received the very first ACT award worth 500 euros. After the prizegiving, Resource talked to four of the six

team members: Femke Tober, Isabella Selin Norén (both Plant Sciences), Jits Riepma (Biosystems Engineering) and Jasper Roebroek (Earth and Environment). Evita Laheij (Organic Agriculture) and Daan van Keulen (Hydrology) were on the team too, but could not attend the prizegiving.

What was the most challenging thing about your ACT project?

Tober: 'A problem like this involves several different parties and they all have different interests. The client, the Dutch Agroforestry Foundation (Agrobosbouw), represents the

THE WINNERS



◀ Jits Riepma, Isabella Selin Norén, Femke Tober and Jasper Roebroek (from left to right) won the first ACT Award with their team.

WHAT IS ACT?

Why study hypothetical issues if you can solve real-life problems? That is the idea behind Academic Consultancy Training (ACT). Clients put a problem to a group of students from a range of Master's programmes, who work towards a shared recommendation from their different disciplines. This enables students to get to know the field, and to try their hand at project work and interdisciplinary teamwork. And the clients get advice from academic consultants for next to nothing.

farmers' side of things, and wants to know how to maximize profits. And on the other side, you have water suppliers, who want sufficient clean drinking water at no extra cost.'

How did you solve that?

Riepma: 'We came up with two scenarios in order to do justice to both sides. It went very smoothly, actually. Because we are a multidisciplinary team, everyone wanted to put forward their own perspective. One scenario would focus more on the farmers' side, and the other more on the water extraction side. Both systems are cost-effective and practically feasible for the farmer, without endangering the quality or quantity of water. So now, Agrobosbouw and the water company can decide for themselves what they do with our recommendations in the end.'


What was your experience of ACT?

Riepma: 'You are put in a group with five other students who you don't know yet. You get presented with a single problem, which you have got to solve together. ACT brings group work to a whole new level.' Selin Norén: 'To answer our question we needed knowledge about agriculture, water and plants. Those were precisely the disciplines we had as a team, so we comple-

'As a team we had precisely the right disciplines, so we complemented each other'

mented each other.' Tober: 'Because each person on the team takes a different view of the assignment, you learn to look beyond your own discipline. That puts everything you know in a broader perspective.' Roebroek: 'Another good thing about ACT is that you are working for a real client on a real question. We went to the water catchment area to see what it looks like and to talk to stakeholders. That also makes the assignment more real.'

What are you going to do with the prize money?

Tober: 'They used to joke I was "the alcoholic" because I kept suggesting we all go for a beer together. In the end we didn't do that very often at all, so with the prize money we are going out for dinner and a few beers at Kruimig.' 

RUNNERS-UP



▲ Claudia Laarman, Johanna Steketee and Nienke Lindt.

Healthier rehabilitation

How do you make a healthy diet and physical exercise integral to what a rehabilitation centre offers? Johanna Steketee, Nienke Lindt, Claudia Laarman, Yvonne Buunk, Jacco Ditewig and Lieke van Disseldorp developed a strategy which focused on better communication and adjusting the physical environment at the healthcare centre. This team narrowly missed winning the ACT Award but were among the top three. The jury said the students successfully combined health, communication and education.



▲ Tijmen Vries, Roel Dohmen, Riccardo Missale and Diego Nunez.

Solar forests in the Netherlands?

Transparent solar panels at heights of four to six metres with crops growing in between them: that is a solar forest. The ACT team made up of Roel Dohmen, Corine de Winter, Tijmen Vries, Diego Nunez, Riccardo Missale and Neeltje van Dooren studied the potential for solar forests in the Netherlands. The students made 3D models and looked at the impact of the light that gets through on the crops. The outcome: solar forests can be profitable but experiments are needed to test the findings. This won them a place in the top three of the ACT Awards.

ANTI-CANCER COMPOUND

Broccoli helps prevent cancer, according to Israeli researchers at the Beth Israel Deaconess Medical Center. The vegetable contains indole-3-carbinol, a compound that (via a protein) removes the brake from a known tumour-suppressing enzyme system. The compound is found not just in broccoli but also in other cruciferous vegetables such as cauliflower and... Brussels sprouts (yuck).

BEDBUGS

Bedbugs like to attack while you are asleep. They have been using that tactic for a long time. Researchers at Sheffield University have discovered that bedbugs were crawling around at the time of the dinosaurs. Who their hosts were back then is unknown. It certainly wasn't the dinosaurs as they didn't have nests. The bugs seem to change their host every half a million years. So we will have them for a while yet.

CRYPTIC

Doing puzzles improves the brain's performance, according to a study from Exeter University. Regularly doing a cryptogram or crossword puzzle makes your brain ten years 'younger'. Which means the scores for tests that measure logical reasoning and memory are similar to those of younger test subjects. Number puzzles such as sudokus have the same effect. Cryptic? No, just yet more proof for the 'use it or lose it' rule.

DOGGY LOVE

Owning a dog is partly genetically determined, says a study from Uppsala University. The scientists discovered that by ploughing through a database of twins. Identical twins turned out to be more likely to both own dogs than non-identical twins. It is not yet known which gene triggers doggy love.



▼ The students were taken up in the air by an experienced pilot.



'Suddenly it's peaceful and silent'

On Friday 17 May, two groups of WUR students were taken in vans to Deelen airbase, where the Royal Dutch Air Force practices. Their mission: gliding.

'You are launched like in a roller-coaster. You shoot up in the air incredibly fast, which pushes you back in your chair and your ears pop. Then the pilot says "We are going to detach the cable" and the glider's nose drops. That's the scariest moment because it seems as if you about to go into free fall. But suddenly it's peaceful and silent. Then you are gliding.'

'The Thymos trips are a unique opportunity to enjoy that experience'

Sonja van der Wal (21) talks enthusiastically about her first time gliding. The Plant Biotechnology Master's student got to go first on the gliding trip organized by student sports foundation Thymos. 'It's better that way as I might have lost my nerve otherwise. Gliding sounds pretty dangerous.

When they explained the safety rules to us, it was all about safety on the ground but not what you should do in the air if things went wrong. I thought that was weird.' Each year, Thymos offers a number of 'experiences' such as waterskiing, sand yachting ('sailing' in carts on the beach) and windsurfing. 'The registration list for gliding is always full in no time,' says Rijk Dersjant of the Thymos committee, who was also gliding for the first time. 'It is a unique opportunity to experience something like this.'

The two-seater gliders are launched by a winch. The students were taken up in the air by an experienced pilot and were able to glide over the Veluwe for six to seven minutes. 'That is enough because it gives you time to feel what gliding is like,' says Van der Wal. Her first go at gliding made her keen to do it again but there are some practical obstacles. 'The Deelen gliding club's trial course costs 250 eu-

ros for one year. That makes it an expensive sport for students. It is also a long way away and I don't have a car.' @ LZ



▲ Master's student Sonja van der Wal talks enthusiastically about her first time gliding.

Hilde Jager is going to the Olympic Games for students

‘I train two or three times a day’

The Universiade is a kind of Olympic Games for students. It will be held this year in Naples from 3 to 14 July. Student of Health and Society Hilde Jager (21) will represent the Netherlands as a judoka.

Top sport and university: how do you combine them?

‘It is quite difficult. I often have to go abroad for tournaments and training. When I’m in the Netherlands, it is easier to combine them, but even then my training comes first, except when I have an exam. I live in a top sport house near Papendal, where a lot of sportspeople live and train. I train two or three times a day, except at weekends. To be able to manage it, I do one less course per period, and I consult with my teachers a lot. Sometimes I get different deadlines or I’m allowed to do a group assignment on my own.’

‘How do you prepare for the Universiade?’

‘I am lucky that I don’t have many tournaments in the next few weeks. So I can carry on training and really get a lot stronger.’

How did you qualify?

‘The Judo Union looked at the different classes and selected from them. I am in the under-70-kilo class. It is certainly not my first international tournament – in fact I only take part in international tournaments – but it is my first big international event with a lot of different sports.’

Do you allow yourself a beer if you get a good result?

‘If I win a medal, I really celebrate. But I don’t drink beer and I’ve got another

tournament straight after the Universiade, so I won’t go too wild at that party.’ **IA LZ**



◀ Judoka Hilde Jager: ‘If I win a medal, I will definitely celebrate’.

MEANWHILE IN... SOUTH AFRICA

‘Changing the ANC leader won’t stop the corruption’

The ANC won the general elections in South Africa on 8 May with a reduced majority. The party has ruled since the democratic transition in 1994, but has failed to tackle internal corruption. The disillusionment of the people was reflected in a low turnout.

‘Lots of my friends made the political decision to not vote. It makes me sad, as I believe in participatory elections. But there is a lack of attractive options. The main opposition parties don’t offer ideal futures either. And they are too contradictory to unite against the ANC. People have lost their faith in the ANC leader Cyril Ramaphosa, and for good reason. He was a non-executive director of Lonmin, the multinational that owned the mine where police killed 34 workers in a protest. He is also an extremely wealthy man, representing capitalist monopoly in South Africa. I am not optimistic about the future. Even if Ramaphosa is better than his predecessor Zuma, I think that changing the leader won’t deal with the systematic corruption within the ANC. Actually, I want to run for president at some point, so I am trying to use the

privilege and knowledge I gather abroad and put it to work in my country. South Africa is facing many chal-



PHOTO: RICH T. PHOTO / SHUTTERSTOCK.COM

lenges, but if there is one issue that needs to be addressed, it’s environmental concerns. Not once did I hear about the environment in the political debate. It is shocking. Floods are killing people and farmers are suffering the worst drought in years. The black population has the highest vulnerability to environmental problems. Living conditions in townships are horrible and people are forced to rely on polluted water. We need to make the connection between environmental and social justice and start supporting the most vulnerable people. I believe one way to do this is by promoting green jobs. The politicians need to change their attitude and start working together to build a state that addresses extreme poverty first.’ **IA**



Malik Dasoo, a pre-master student in International Land and Water Management, reflects on the recent events in his home country South Africa.

YOU

ON CAMPUS

There are more than 12,000 students on the campus in Wageningen. What keeps them busy? For each edition, *Resource* asks a student picked at random.

Master's student of Food Technology Eline Brader (22) is not interested in parties or holidays. Her days nearly always look exactly the same. 'I get up, go for a walk, go to class, and after that I study or work. That's what makes me happy.'

Working and walking. That's all Eline needs in life. 'I walk 10 kilometres every day. I do that on 361 days of the year, and on the other four days I join in the Nijmeegse vierdaagse (a four-day walking event, ed.).' And those are the only days Eline takes off. 'Apart from that, there hasn't been a single day when I haven't worked in the last two years. I don't like holidays. They make me more stressed than relaxed. I would just rather work. I am quite a boring person really.'

As student-assistant, Eline has carried out data analyses at Food Microbiology and or-

ganized sensory research in the Restaurant of the Future. 'In the next academic year I shall be helping with a chemistry course as a student-assistant. And I work in Atlas in the Publicity and Recruitment department, helping package things up. At weekends I work long days in the café at Burger's Zoo. My contract there has just been renewed indefinitely.'

'I'm quite a boring person really'

ly.' The long hours she works are no problem for her. 'I just want to have something to do. I can't watch TV without doing something useful at the same time. I've got to be doing something useful to feel good.'

As a student of Food Technology, Eline is



PHOTO: ANNE VAN DER HEIDEN

happiest working on modelling, statistics, maths and data analysis. 'I like data analysis in any shape or form, but especially if it's about something that interests me, such as food.' Mars products such as Snickers, Twix and M&Ms are what interest Eline most. 'To me that chocolate is special, nice to look at and yummy. I'd love to do data analysis at Mars. I can picture myself working there after university.' **AvdH**

'There were 10 suit-and-tie guys here yesterday'

DIARY OF A CARETAKER

Christoph Janzing works for Idealis as a caretaker. He writes about his experiences for *Resource*. Read all his columns on resource-online.nl

Beer all over the stairs, crisps everywhere, a stressed-out cleaner. In his last column, Christoph Janzing wrote about the mess he found one morning in Hoevestein. It was his job to track the culprits down.

'Sixteen floors, 49 flats, 371 rooms. How in God's name am I supposed to find out who smothered the stairwell with a sticky mixture of crisps, beer and wine? It's like looking for a needle in a haystack. I step over a few empty beer cans. How do I go about this? I need some informers...

"Yesterday evening there were about 10 suit-and-tie guys hanging around on floor X," says a resident who is no happier than I am about the mashed crisps on his shoes. That's my first clue. Crisps crackle underfoot as I make for floor X.

After ringing the bell in vain, I open the door to one of the flats. Bingo: a tray of full beer cans of the same brand as the cans on the stairway. I feel like a child on the brink of finding a golden Easter egg. My second anonymous source tells me that someone invited his year group to a party yester-

day. "He is asleep at his girlfriend's in flat Y," she says. Gotcha.

'He got a shock when he saw the mess he and his year group had left behind them'

One minute later, a resident of flat Y opens the door in a dressing gown. She calls her boyfriend over. He looks hungover and he gets a shock when he sees the mess he and his year group left behind them. "No, this is definitely not normal," he croaks hoarsely. He gets even more of a shock when I tell him what it is going to cost to get the stairwell cleaned up. "That is too much. I can do it more cheaply myself," he assures me, as though he was the director of a cleaning company. In the end we make a deal: he can clean up some of the mess himself and he has to pay for the rest of it. A bit later, the whole year group are scrubbing the stairwell, bleary-eyed and groggy. A spontaneous afterparty... **AvdH**



Wageningen Master's students do internships and thesis research all around the world, getting to know their field and other cultures. Here they talk about their adventures.

Off the beaten track in Cambodia


'The province where I did my research is full of endless rice fields and little else. Actually I don't like rice much...

I did research on how rice farmers see their use of pesticides and their health. In the first village where I held interviews, my interpreter and I sat in the house of the head of the village. He got farmers to come and see me. It was going to be done the same way in the second village, but then it got a bit more difficult. Why that was, exactly, escaped me for a long time. I reckon it had something to do with the approaching elections. The government did not want meetings with farmers to be organized for fear that they would be influenced in their voting.

age of teachers. So there are a lot of expats teaching in Cambodia now, which means a lot of children speak a little English. When I went to the market or into a shop, a child would often be conjured up from somewhere to translate for me. In daily life I didn't notice much of the impact of the war; most people are reluctant to talk about it, and it is not something you casually ask about.

OUTSIDER

My time in Cambodia was really very nice. Because I went to villages that were not on the tourist routes, I think I got a more realistic and unique picture of the country than most people who visit Cambodia. I would

have liked to stay longer, and I would love to go back one day to see how the country has developed. But I wouldn't want to live there, because I would always remain an outsider. Even if I spoke the language fluently, I would still be that tall, blonde, foreign girl.' 



THE WORKS

- Who?** Merle Schots (27), MSc student of Health and Society
- What?** Thesis research at IRRRI (International Rice Research Institute)
- Where?** Phnom Penh, Cambodia

'Often a child would be conjured up from somewhere to translate for me'

During the elections I took a week's holiday in Vietnam. My colleagues were concerned about me because there were a lot of riots during the previous elections. In the end, the elections passed reasonably peacefully. But because I had also been invited to a wedding in Vietnam, it was good timing for that holiday anyway.

WAR

Cambodia suffered under the reign of terror of the Khmer Rouge and a protracted civil war. About 25 per cent of the population were killed. Intellectuals were among the specific targets of executions, which has led to a short-



Do you too have a nice story about your internship or thesis research abroad?
 Email lieke.dekwant@wur.nl.

Announcements

Rising Talent Prize for women in science

The aim of the Rising Talent Prize (€3500) is to help young female researchers in the Netherlands get ahead in their careers and to recognize their academic achievements and improve their potential. The winners of the Dutch Rising Talent Prize can also be nominated for the international Rising Talent programme for Women in Science. The prize is an initiative of L'Oréal Netherlands, the Dutch UNESCO commission and the Royal Holland Society of the Sciences and Humanities (KHMW). Women who want to be considered must be employed as a PhD candidate or postdoc in the life sciences, science, technology, engineering or maths, and have no more than three years' post-PhD experience.

UNESCO.NL

Forum Library Exhibition: A selection of artwork by five WUR librarians

In their free time, WUR librarians are bursting with creativity, trying out new artistic techniques and trending crafts. This highly original exhibition brings together the artwork of five WUR librarians: Anita Dijkstra, Charles Leon, Linda Persoon, Jan Vos and Joke Webbink. On show are one-of-a-kind pieces and unique, high-quality artwork. Come and admire the exhibition on the third floor in Forum Library. It runs until June 2019. Are you an artistic scientist or a scientific artist yourself? The Library is always looking for artwork for upcoming exhibitions. More info: monique.braakhuis@wur.nl.

Agenda

Thursday 22 to 31 May

SHOWING AT MOVIE W

Three Identical Strangers: British bi-

opic about three identical brothers who grew up separated and were reunited by chance 20 years later. *High Life*: British sci-fi about prisoners in space. *The Man Who Stole Banksy*: International documentary about how everything can be commercialized. *Nureyev*: Documentary about the exceptional life of the Russian ballet dancer Rudolf Nureyev. On Friday 24 May, Studium Generale is organizing a special screening of *Sand Wars* with an introduction by Prof. Ton Hoitink (WUR) and a Q&A session afterwards. Admission for *Sand Wars* is free. Venue: Wilhelminaweg 3A, Wageningen. €6.50/€5.

MOVIE-W.NL

23–25 May, 30–31 May and 1 June, 20:30

PERFORMANCE OF DON JUAN IN BELMONTE ARBORETUM

Ten students from the Wageningen Student Theatre Society 'Pierrot et Colombine' will be performing *Don Juan* in the lovely gardens of the Bel-

monte Arboretum. Happy newlyweds Don Juan and Elvira board the plane for their honeymoon. But will Don Juan be able to cope with the dizziness from the flight? Should someone help him? And who? Elvira or the friendly stewardess who smiles so sweetly? *Don Juan* is a show about following your impulses and living your life in complete freedom without restrictions or consequences. But is that really possible? Or will Don also have to accept that life is not just one long party and you always end up paying the price? Visit the website to reserve tickets. wstv.nl

Wednesday 29 May, 20:15–21:15
TRIAL MEDITATION LESSON: COULD IT BE FOR YOU?

Would you like to learn how to meditate? Do you think meditation is boring? Or not like the thought of losing control? Join this trial lesson and discover for yourself that meditation gives you a grip on who you are. You



4 June | 2019

WeDay

Register from
15 April thru 28 May

We Day 2019: Don't miss this year's edition of the afternoon filled with sporty activities for all employees! Try kickboxing, follow a trail leading through buildings on the WUR campus or chill out at the music workshop by WUR's very own orchestra. Check the We Day intranet page for more information and sign up.

We Day location: Wageningen Campus, Sports Centre de Bongerd

 **WAGENINGEN**
UNIVERSITY & RESEARCH

idealis



**Vakantiekraacht
medewerker Verhuur**

**Interesse in
vakantiebaan?**

Rustig tijdens de zomermaanden? Niet bij Idealis! Aankomende eerstejaarsstudenten zijn op dat moment op zoek naar een kamer. Dat betekent automatisch veel werk voor ons. Heb jij de zomermaanden nog niet volgepland en wil je werken in een leuke en informele omgeving? Dan zoeken wij jou!

Idealis zoekt per direct tot 1 oktober (dus niet voor een paar weken) een medewerker Verhuur voor het liefst 36 uur per week. Als medewerker Verhuur zorg je dat het verhuurproces goed verloopt. Je beantwoordt vragen van onze klanten, zowel aan de balie, telefonisch als per email.

Salaris

Je salaris is € 2.241,- bruto bij een 36-urige werkweek.

Heb je interesse?

Stuur dan zo snel mogelijk een korte motivatie en een CV naar vacatures@idealis.nl ter attentie van Angela Driessen, HR-specialist.

Kijk voor meer informatie op www.idealis.nl.

need to allow time for this, but the try-out guides you through the process. Meditation makes you calmer, milder, more balanced and more focused. It is good for your heart rate, blood pressure and sleep. You get a grip on your thoughts, feelings and convictions in a good way. After this trial lesson, you can progress to the short basic course from 5 June to 10 July. Students get 10 per cent discount.

ZIJNVOLZIN.NL

Friday 31 May, 19:30–22:00 NEW SCIENTIST LIVE WITH SCIENCE TALENT 2019 AWARD

At the New Scientist Live event, the five nominees for Science Talent 2019 (including Daan Swarts from WUR) will give a short pitch about their research. The annual prize is awarded to the most promising young scientist in Belgium and the Netherlands. There will also be talks by primatologist Frans de Waal, moral philosopher Katleen Gabriëls and

astrobiologist Inge Loes ten Kate. At the end of the evening, there will be a ceremonial announcement of the New Scientist Science Talent of 2019. Venue: Tivoli Vredenburg, Utrecht. For tickets, see the agenda on the website:

NEWSSCIENTIST.NL

Monday 27 May, 12:30-13:30 THE SOUNDS OF SAND

Did you ever realize that sand has a sound? And that it can even sing? During this lunch event, a scientist and an artist share their fascinating experiences of discovering and examining the sounds of sand. Prof. Saskia van Ruth, professor of Food Authenticity and Integrity, reveals how listening to the sound of sand from Dutch shores using sound spectroscopy provides information on its provenance. Why does sand from North Holland sound very different to sand from Zeeland? Multimedia artist Lotte Geeven examined the special phenomenon of acoustic

sand: sand that sings, whistles, whines and roars. She went on a quest around the world for this 'singing sand', and invited an orchestra to interpret its sound – with mesmerizing results. Watch *Score*, her short film of this adventurous artistic endeavour, and experience the magic of singing sand. Venue: Impulse.

Wednesday 29 May, 20:00 UNPLUGGED VAN UVEN FESTIVAL

Student orchestras De Ontzetting and WSKOV invite everyone to this acoustic festival of music, poetry, dance and comedy. Venue: Café Loburg, Wageningen.

Thursday 6 June, 10:00–17:00 ANNUAL CONFERENCE: HEALTHY INNOVATION – SUGAR EDITION (IN DUTCH)

Foodlog is organizing a conference focused on improving our food and health system. We will be talking to scientists, policy-makers, product developers and critical consumers about the issues and solutions concerning sugar: the product itself, the food context in which it is offered and consumers' lifestyles. Come along and have your say! Students get a discount. Venue: World Food Center/Akoesticum Ede.

GEZONDEINNOVATIE.NL

Saturday 15 to Sunday 16 June, mid-night to morning AMNESTY WAGENINGEN STUDENT GROUP: NIGHT OF THE REFUGEE

In the 10th edition of the Night of the Refugee, thousands of participants will walk through the night to raise money for emergency aid for refugees worldwide. This is a unique event that takes place in 10 different cities. Are you coming along? Together with the Amnesty Nijmegen student group, we will walk 40 km from Nijmegen to Arnhem starting at midnight on 15 June. Participation is free. The idea is that everyone asks friends and family to sponsor the group or individual. Please register at nachtvandevluchteling.nl/team/aaisnaisw to join the team.

Colophon

Resource is the magazine and news website for students and staff at Wageningen University & Research. Resource magazine comes out every fortnight on Thursday.

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Marc Lamers, Corporate Communications & Marketing Wageningen University & Research



>>TYPICAL DUTCH



Bring your own floor

Three weeks before we moved to the Netherlands for my PhD, I arrived here to look for housing for our small family (two parents, one child and a dog). Hesitating before making a decision, I called home to discuss it together.

'Honey, I'm in an apartment that I've found for us.' 'Really? That's great! What does it look like?' 'Well, it's a one-floor apartment on the ground floor. It's charming, has a small garden, some furniture, large windows. Lots of light inside. The neighbourhood seems to be nice. But it doesn't have a floor.' 'Doesn't have a floor?! So what are you standing on?' 'Well, on the floor, but... there is nothing *on* it. No carpet, floorboards or laminate.'

Apparently, an apartment or a house in the Netherlands can be offered for rent with an oven, stove, fridge, dishwasher, some cupboards, but... no flooring. I find it weird – and inefficient and unsustainable – that tenants who are not lucky enough to meet the previous tenants and take over their flooring often have to put new flooring in a rented property. When they leave, they must – *yes, must* – remove the flooring. As if the chances that the next tenants would also need flooring were very low. So far I haven't met any Dutch person who could explain this strange phenomenon. Maybe I will solve the riddle by the time I graduate.

📍 Efrat Gommeh, a PhD candidate in the Public Administration and Policy group, from Israel

You can rent a house in the Netherlands with an oven, fridge, dishwasher... but no flooring

Do you have a nice anecdote about your experience of going Dutch? Send it in! Describe an encounter with Dutch culture in detail and comment on it briefly. 300 words max. Send it to resource@wur.nl and earn twenty-five euros and Dutch candy.