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On track



university of
 groningen

From the boardroom

From June 21 to 24, 2018 the 30th Annual Meeting and Anniversary Event of the Society for Light Treatment & Biological Rhythms (SLTBR) will take place in Groningen. Founded in 1988, SLTBR is a multidisciplinary group dedicated to promoting research and knowledge transfer about the biological effects of light. In view of this event, the BCN Symposium 2018 will be devoted to chronobiological research and incorporated into SLTBR 2018.

The alliance of the Universities of Gent, Göttingen, Groningen, and Uppsala (U4) recently met in Belgium. Being part of the U4 Ageing Brain cluster, BCN will participate in a meeting in Uppsala in May. Later this year, Erik Boddeke, the cluster coordinator for Medicine and Pharmacy, will organise a second meeting in Gent devoted to new spearheads in research i.e. Public Health. U4 as a group also intends to present diplomas and certificates to PhD students, starting this year.

Since 2016, the Guild, a group of 19 research-intensive universities from across Europe, including U4, has combined forces to enhance the voice of academic institutions, their researchers, and their students in Brussels. Maarten Eisema

(<https://www.rug.nl/staff/m.h.eisema>) is the new EU Liaison Officer and can be approached on matters involving initiatives of the Guild or possibilities of funding.

It is important that BCN is informed as early as possible of the appointment of new senior researchers. This way, the new researchers can be invited in time for the annual PI-meeting or to teach a course for the PhD students. Information should be addressed to Evelyn Kuiper, BCN's secretary.

NeuroLabNL, one of the 25 routes of the Dutch National Research Agenda (Nationale Wetenschapsagenda: NWA), met on December 20, 2017. Items discussed included fundamental research on brain and cognition and the development of new initiatives. A large group of our senior researchers attended the meeting to ensure that BCN's views on the matter were made known to the audience. The next meeting of NeuroLabNL will take place on February 19, 2018.

■ BY FRANS ZWARTS

■ PHOTO BY ELMER SPAARGAREN



> STAFF MATTERS

BCN PhD programme – A beautiful interdisciplinary training programme!

It is my great pleasure to write this piece for the BCN newsletter, which is very dear to my heart. When I moved to the Netherlands from the US in 2009, I was hoping to find a vibrant, lively, exciting, and also friendly academic community. With this quest, shortly after my move, I found BCN. One of my first positions within BCN was being the editor-in-chief for the newsletter, preceding Sander Martens. This opportunity led me to get to know many BCN members, from all levels of academic careers and from a wide range of backgrounds and expertise. Some became collaborators, and even good friends. In short, I did find all I was looking for within the BCN family!

Many of you are familiar with our education programmes; we have a spectacular BCN Research Master (ReMa) and a no less spectacular BCN PhD Programme. The BCN Education Committee is an advisory committee to the BCN Board as well as the faculty boards on all issues related to the BCN PhD programme and its students. Since BCN is an interfaculty research school, covering five faculties, our PhD students also come from different faculties, departments, and sub-programmes. Just the 2016 cohort is a good example of this diversity. In 2016, BCN welcomed 72 new PhD students: 62% of them started a project at UMCG, 18% at the Faculty of Science and Engineering, 11%

at the Faculty of Arts, and 8% at the Faculty of Behavioural and Social Sciences. Diversity also extended to geographic backgrounds: 43% of these PhD students are Dutch, 32% have another European nationality, and the others come from all different parts of the world. This makes BCN a unique intercultural, interfaculty community!

Since the end of 2012, I have been chairing the BCN Education Committee. The committee consists of, in addition to the chair, representatives from the BCN faculties, BCN PhD Council members, as well as the BCN-Office, who actually do all the heavy lifting and ensure the actual day-to-day functioning of

our committee and the PhD programme. (It is hard to imagine, but Diana Koopmans meets every single new PhD student in person!). In my position as the chair, I also represent the BCN Education Committee within the BCN Board, and the BCN Research School within GSMS Education Committee. As a result, one of my most important responsibilities is to be the middle person making sure our PhD Training Programme continues providing a high-quality education, meets the needs of an interdisciplinary structure and follows the values and principles of BCN, while also seamlessly fitting within the many requirements from different entities that BCN is a part of. It is a challenge, but also a fun and interesting one, always keeping us committee members alert and in good communication with each other.

While BCN PhD students are officially enrolled in their own graduate schools within their own faculties, they have the opportunity to strengthen their expertise, knowledge, academic network and CV by taking part in the BCN Training Programme. The BCN Training



> *While the motivation came from a positive thought, it was clear that the implementation would present multiple challenges* <

Programme consists of a core programme with a number of obligatory courses. These courses not only provide scientific knowledge and skills in the B, C, and N tracks, but also serve the purpose of bringing together PhD students from varying backgrounds and disciplines, to establish and maintain strong connections between the BCN research groups. Further, the core programme also allows students to gain necessary research skills in several categories, such as project management, statistics, as well as finding one's way by exposure to various BCN research programmes, such as via the BCN orientation course. Half of the amount of EC's of the programme comes from non-obligatory courses and activities, which gives the PhD student the opportunity to choose the courses and activities that they need for their project.

As the BCN Education Committee, one of the other challenges that we face is to adapt to the ever-changing needs of PhD students. The interdisciplinary structure of BCN is what makes this research school beautiful and special, yet it is also a great challenge to modify our training programme to the needs of students who come from widely ranging backgrounds and disciplines. Even a basic course that is offered in statistics, which undoubtedly every young PhD researcher needs, needs significant(!) amount of planning from the initial concept proposal to the final design. This involves tailoring the content to cover the widely varying needs of most students and finding the right expert who can deliver such a course. In a recent quest to do so, we have been lucky to provide such a course, which has now become immensely popular.

The needs of PhD students also change with time. Going with the example of statistics, Bayesian statistics has been of great interest for many students in recent years. However, due to the lack of local expertise, a course on Bayesian inference could not be offered on-site. To be able to cover such needs, we provide offsite course opportunities to our students. Further, for all courses that cannot be offered locally, we have also developed a system where the students can receive ECs via digital courses, given that they plan it with their supervisors and receive a certificate of attendance.

A recent challenge came from the new "bursalen" programme, a new model of PhD scholarship. The programme was the result of a nationwide programme where the government and a number of universities agreed to use governmental PhD funding in a different financing schema, which would lead to an increase in the number of PhD positions available and hence provide a positive stimulus to research programmes. While the motivation came from a positive thought, it was clear to the committee that the implementation would present multiple challenges. Since the Education Committee is only an advisory committee to the boards, we were not part of making the official decision to participate or not, while the faculty boards did. However, we did use our function to the full extent to show our reaction and give our advice for minimizing the negative consequences for students. These efforts resulted in better benefits for PhD scholarship students and an improved training programme for a stronger transition to accommodate the increased numbers of PhD students.

One of the greatest opportunities within the BCN Education Committee is for the PhD students to voice their opinion. The BCN PhD Council members form an essential and invaluable part of the Education Committee. The PhD Council is our direct line of communication with BCN PhD students to stay up to date with their needs, ideas, suggestions, and concerns.

We work closely with them to make sure the efforts we take as the committee are relevant to the target community, and provide good solutions to the problems brought up. We work together not only for the official training programme and content, but also for making sure that there are sufficient opportunities for the BCN students to socialize within professionally organized events, where they have many opportunities to meet fellow PhD students and faculty members, and learn supplementary skills, while having fun too. The enthusiasm and young energy that the Council brings to the committee also greatly increases our motivation to do our job as the Committee better.

If you, as a student, researcher, or faculty member, are looking for opportunities to become more involved within BCN and its teaching programmes, you know where to find us! And please do find us! We greatly value the diversity within BCN, but can only benefit from it if more opinions are voiced and represented.

■ BY DENİZ BAŞKENT
■ PHOTO BY ENJA JUNG

Interview with a BCN Board member: **Ton Groothuis**

Prof. dr. Ton Groothuis is a professor of behavioural biology, a member of the BCN board, and director of the Groningen Institute for Evolutionary Life Sciences. His main research interests are the integration of mechanistic and functional/evolutionary approaches to behaviour, developmental-behavioural endocrinology where he focuses on hormone-mediated maternal effects, the development of animal personality and lateralization of brain and behaviour.

As a biologist, what drew your attention to the field of ethology? What intrigues you about animal behaviour?

Animal behaviour is so diverse that two questions come to mind. How is the brain able to do all these completely different things and what does this tell us about human behaviour? Moreover, how did evolution manage to create all this diversity and how does it reflect adaptations to the diversity in the environment? Evolution and adaptation is often seen as the outcome of genetic modifications. I am interested in to what extent mothers, based on the environment in which they live, can actually translate that environment via hormonal signals to their offspring, telling the offspring about the environment that they will be born in, similar to a weather forecast. This may profoundly affect the speed of evolution.

In your opinion, what is the importance of studying animal behaviour in its natural habitat? How do findings in this field contribute to the understanding of human behaviour?

Behaviour has been shaped by evolution to enable animals to survive and reproduce in their natural habitat. If the animals are isolated from their natural habitat, you might come to the wrong conclusions because you are putting an animal in a condition for which that behaviour did not evolve. At the same time, a standard laboratory

setting is much simpler than the complex social environment, so you might miss important aspects of the regulation and complexity of behaviour. There is also evidence that if you do pharmacological manipulation, the context in which the animals are kept affects what the compound is doing. Moreover, behaviour is an expression of the interaction between the environment and genetic information; if you study heritability and genetics of behaviour in simple conditions, you might get answers based on genetic information that is incomplete. Regarding domesticated lab animals, we now have good evidence that their behaviour has been substantially changed and simplified compared to their wild ancestor. For example, in the regulation of aggression, some domesticated strains of rats lack part of the spectrum of normal aggressive behaviour, which could lead to odd results by missing an important part of their behavioural complexity. If we want to translate results from animal models to the complexity of human behaviour, we not only need to select the appropriate species, often not the standard lab strains of rodents, but also the appropriate complexity of contexts and behaviours. The field of Neuroscience is well developed in the Netherlands, but as behaviour is often used as an important read-out parameter of the brain, using very simple behavioural tests in simplified contexts, we urgently need to invest more in ensuring that behaviour is analyzed at the same sophisticated level as the brain itself.



Some of your work has focused on hormone-mediated maternal effects, what are the most relevant findings in regards to the development of the brain?

In many animal taxa including humans, the hormones of the mother reach the fetus. In the medical field, for a long time there was the idea that the fetus should be protected from these hormones. But in the field of behavioural ecology or evolution, the idea is that if these hormones reach the fetus so often, then there is a good reason for this. It is seen as an adaptation; meaning, that this is not something detrimental but a result of evolution because it improved the fitness of the offspring and/or the mother. Thus, we have

> This may profoundly affect the speed of evolution <

two opposite concepts in two different fields. What became apparent is that there is a lot of communication between the mother and the offspring by hormonal signals. Not only is the mother sending signals to the fetus, but the fetus is also trying to influence the mother. This is because the mother and fetus may have different interests, known as parent-offspring conflict. In addition, this early exposure to hormones is intriguing, as we know that the brain is very sensitive to these hormonal signals in early life; it might also be the case that these early signals determine the developmental trajectory of those offspring, affecting its behaviour later in life.

What is the parent-offspring conflict?

In parent-offspring conflict, the offspring has other interests than the mother. If the mother produces more

> *The general public has the misconception that testosterone is a male hormone* <

than one offspring, she likes to divide the available resources over all the offspring, while the offspring would like to get as many resources as possible. With hormones, mothers could end the fetus' life in an early stage of development if there are no sufficient resources for both. This, of course, is not in the best interest of the offspring, and, therefore, there is an evolutionary arms race between the mother and the offspring.

What is animal personality at the ethological level? We know that steroid hormones have a very broad effect on all sorts of traits in the offspring, from effects on their behaviour and physiology, endocrine system, stress vulnerability, growth trajectory, to morphology, which all in turn affect behaviour too. Personality is by definition a syndrome of different behavioural traits that are linked to each other. Hormones are a nice tool for the mother to create personality because they have many pleiotropic effects. There is also some evidence that these early hormones have effects on personality traits in humans.

Are there sensitive periods in which these hormones have their effects?

The most well-known sensitive period is the perinatal stage, while there is recent evidence that adolescence or the pubertal stage is also an important sensitive period. After that, hormones often have short-lasting effects and not these long-lasting organizational effects. We actually have a project running, which includes transgender subjects. This will allow us to study the effects of experimental manipulation with steroid hormones on behaviour, brain lateralization, and masculinization. Among some of the outcome measures to be acquired are fMRI, expression of sexual behaviour, sexual identity, and play behaviour.

What are some of the public misconceptions regarding the role of sex hormones in the developing brain that you think should be addressed by scientists?

One misconception is that lateralization is unique to humans. Animals, including insects, which do not even have proper brains, reptiles, birds, rodents and primates, are all strongly lateralized; it is a very fundamental way of organizing the brain, allowing us to study the evolution of lateralization and make use of animal models. Second, the general public has the misconception that testosterone is a male hormone and estradiol is a female hormone, which as we well know is not true: in males a lot of effects of testosterone are mediated by the conversion of testosterone to estradiol in the brain, while in females estradiol is made from testosterone. Third, another misconception is the idea that maternal hormones are harmful to the embryo. Regarding stress hormones in scientific research, like cortisol, the idea that high levels are detrimental to the offspring might be a reflection of the extremely artificial conditions the mothers were exposed to during pregnancy. These conditions would never occur in nature and there would have never been selection against these extreme hormone levels. Cortisol is a very important adaptive hormone, and these results might not reflect that. Finally, many people, including scientists actually, have a very simplistic view of behavioural development, the role of genes and genetic information, heritability, and related concepts, leading to sometimes dangerous misinterpretations of scientific results.

■ BY JAIME MONDRAGON

■ PHOTOS BY SANDER MARTENS





Now what? Life after the defense: A double interview with Leonie Bais and Shankar Tumati

Shankar Tumati became interested in research during his medical training and decided to move from India to Groningen to do a PhD about apathy in Alzheimer patients and how this relates to brain changes. He recently discussed his PhD experiences with Leonie Bais, whose PhD project was about using Transcranial Magnetic Stimulation (TMS) in schizophrenia patients, while also working at Lentis (mental health care Groningen). While Shankar has moved to Ottawa, Canada to work as a post-doc, Leonie is finishing a large study together with her colleagues and accepted a third job at Lentis.

> *I found it surprisingly easy to get accustomed – all one needs is a bicycle* <

SHANKAR: Congratulations on finishing your PhD project! You have followed an unusual path – you were working at a mental health clinic throughout your PhD project. How did you benefit from this dual-track approach?

LEONIE: Thank you! Indeed, my path has been quite unusual. After I graduated, I started working as a research assistant both in the research group of André Aleman and at the research department of Lentis. Although I did not work as a therapist at Lentis, I learned a lot about the practice of mental health care. This helped me to understand the need for clinically relevant research. You are a medical doctor from India. Why did you choose to do a PhD project in the Netherlands and how was it to live here?

SHANKAR: During my medical training, I attended a research internship at the UMCG, and my interest in brain research deepened. So, I met André Aleman, my eventual supervisor, to discuss the possibility of doing a PhD project there. I was very happy when he said it would be possible. The Netherlands is a beautiful country seeped with history and a very uniquely flat landscape. I found it surprisingly easy to get accustomed – all one needs is a bicycle.

LEONIE: Do you have any tips for foreign PhD students on how to survive in the Netherlands?

SHANKAR: The big difference for me was not having my social network anymore. The Netherlands is an easy place to adapt to in most practical aspects, but cultivating new friendships is very important. There are many things to do in Groningen, for example, the ACLO

or USVA for more artistic pursuits. Also, the language center offers a free basic Dutch course – doing that will make life a lot easier. Are there any lessons from your studies that you were able to apply directly to your life?

LEONIE: Maybe the idea that you sometimes have to do things that are out of your comfort zone. Actually, doing these things can be rewarding and contribute to the reduction of insecurity. I have also seen this in the patients that participated in our studies, and I think letting patients have positive experiences and be confident about themselves should be an important factor in mental health care.

SHANKAR: What were your methods to deal with stress? Is there a particular way that you found most helpful?

LEONIE: I think the most obvious answer in my case would be doing a lot of yoga! I practice a quite physically demanding type of yoga, which helped me to get rid of the information overload in my head. Aside from yoga, I also needed to do other things of course, like meeting my friends and family, going to parties, reconstructing my house, baking cakes... Did you experience any problems or high workload during your PhD and how did you cope?

SHANKAR: During my PhD, I experienced a paradoxical mix of feelings – the pace was at times too slow and on other occasions, I felt overwhelmed with too many items on my to-do list. In retrospect, I could have paced myself better and focussed more on the core part of the project. How one deals with challenges is probably very individual. For me, it was a mix of sports, lots of reading,

participating in a theater group, and regularly talking to my family. All these activities relieved stress in their own way.

LEONIE: What are you currently doing?

SHANKAR: I moved to Ottawa, Canada for a postdoctoral position. I am continuing to work on a part of my PhD research using a different approach and am also working on new projects. So far, the shift has been smooth and I am enjoying my time in the new lab. What about you? How has it been for you since the PhD defence?

LEONIE: I have to admit I was not looking forward to the day of my defense in the first years of my PhD trajectory. But as this day gradually approached, I slowly became more confident that I could do this thing. Although I was very happy right after the defense, it took me a while to realize that my PhD was definitely finished. I had been working in the 'PhD mode' for a long period, so I had to destress for some time. When my brain prompted me again with creative ideas, I knew I was 'back to normal'. In the last months, I have been working at the NeuroImaging Center to finish, together with my colleagues, a large study on apathy in patients with schizophrenia. I still work at Lentis Research, where I do all kinds of things, and I put myself a bit more to the test by accepting a third job, also at Lentis, to do research in a department for psychiatric patients that need long term treatment in a clinical setting.

■ BY MANON VAN ASSELT

■ PHOTO LEONIE BY SANDER MARTENS

■ PHOTO SHANKAR BY STEPHAN KEEREWEER



Scientist in the classroom: A new initiative from the Children's University

> In the last two years, ten thousand children participated in the junior MOOC <

For scientists, the importance of communicating the results of their studies to the rest of the world is hard to deny. Although there is certainly an intrinsically pleasurable part to digging deep into a topic and solving previously unsolved puzzles, the end-result still has to leave the sometimes well-isolated ivory tower. With this idea in mind, the University of Groningen established the Children's University, aimed at introducing science and the university to children 10-12 years old. Recently, the Children's University launched a new initiative, aptly named "Scientist in the classroom". The BCN newsletter is a big fan of this initiative and we will talk with some of the key (BCN) players in this issue and the next!

Douwe van der Tuin, the coordinator of the Children's University, played a key role behind the scenes. Next

to his work for the Children's University, he works on a freelance basis as a science communicator and is the

chairman of the swimming club "de Watervrienden" in Assen. He provided some background information on the Children's University and "Scientist in the classroom".

The Children's University is a collection of initiatives organized for primary school aged children. The Children's University started out with special children's lectures about topics connecting to day-to-day experiences of primary school children such as sports, gaming, and bullying. Every year, the Children's



> *Almost everyone said "YES" right away!* <

University organizes around eight lectures tailored to children of these ages. The Junior Massive Open Online Course (MOOC) called "Scientist in the classroom" adds to what the Children's University offers by bringing the material to the children (in their classroom) instead of the other way around. The junior MOOC consists of a series of seven classes with a wide variety of topics, ranging from physics to philosophy. A class consists of a couple of videos with the scientist introducing their topic and some detailed suggestions for the teacher to help him/her create a lesson around what was discussed in the videos. This series of classes nicely adds to the already existing children's lectures because it is more interactive and informal and provides study material alongside a (much shorter) "lecture". Additionally, because the video and the teaching materials are published online, the junior MOOC

and Martine Maan talk about, among other things, their classes and why they wanted to be a part of the initiative.

Thanks for answering these questions! To get started right away, why did you want to participate in this initiative?

NATASHA: I was actually one of the initiators of this initiative! It started with my participation in the course 'Wetenschapscommunicatie met kinderen' (Science communication with children) in 2014-2015, in which Prof. Diederik Roest (High Energy Physics) was one of the other participants. We were already both active in communicating science to kids, but mostly to teenagers in secondary schools. This course made us realize that there is less activity in this domain for kids in primary

provides the opportunity to reach a much larger audience. And the efforts seem to pay off: in the last two years, ten thousand children already participated in the junior MOOC!

The popularity of the junior MOOC among primary school children combined with the fact that four of the seven researchers involved in the initiative are part of the BCN provide more than enough reason for the newsletter to talk to these four researchers. In this issue, Natasha Maurits

school. So, we wanted to explore whether it would be possible to develop something specifically for this target group. We first had a very inspiring meeting over drinks with Mladen Popovic (Old Testament and Early Judaism), who, like Diederik, had already been active in the 'Kinderuniversiteit', which is also organized by the 'Scholierenacademie' of the University of Groningen. Soon after, as far as I remember, we met with Arjen Dijkstra and Douwe van der Tuin from the Scholierenacademie and some of their colleagues, which got the ball rolling. They were very enthusiastic about our initiative, coming from researchers themselves, and supported us tremendously in making the MOOC happen, both in terms of money and organization. After that, we approached all other teachers who now participate in the MOOC, to ask if they wanted to join. Almost everyone said "YES" right away!

MARTINE: There are many reasons why I wanted to participate. I thought that the process itself, of developing the lessons and the videos, would be fun – and it was. I also liked the idea of showing school children what happens at a university, to make them aware of the importance and diversity of scientific research and to stimulate their curiosity. Finally, I jumped on the possibility to teach children (and their parents and teachers) about sustainability and biodiversity conservation, which are closely linked to the topic of my lesson.

The lessons were centered around a certain topic. What was the topic of your lesson and why did you decide to pick this topic?

NATASHA: My topic is "Mensen in alle maten" (People in all sizes). I wanted to make a lesson about mathematics which would not be too abstract and which would allow the children to do as many hands-on exercises as



> I was struck by the fact that several children asked really good scientific questions <

possible. I decided to give them a simple introduction to descriptive statistics and how you can acquire normal values for specific measurements. So, I had to choose a measurement they could do themselves: measuring their height. The interesting thing was that the first time the MOOC ran, children actually didn't realize that this lesson was about mathematics, which was not really my intention. They thought it was about height and asked me all kinds of biology questions! So, I added some extra material on mathematics, with an additional movie that we shot in the Stadswerkplaats in Groningen, the second time around.

MARTINE: My topic was biodiversity. This is closely related to my own research (I study the process of speciation), and it's easy to connect to the children's own daily lives and interests.

that was a challenge. I decided to give a lot of examples and build up the lesson from really simple building blocks, while still adding some material for the clever kids who would like to have a bigger challenge. And I added some fun in the movies.

What do you hope the children will have learned from your lessons?

NATASHA: The short answer is: math can be fun and useful and that it is part of science.

MARTINE: I hope I made them think about what "species" actually are, and that I managed to make them a bit more aware of how the natural world works, how important it is for us, and how their own behaviour can have an impact.

How did you make the complicated material accessible and interesting for the young children?

NATASHA: I already had experience teaching guest lessons at primary schools, so I had some ideas about what worked and what didn't. What I found quite hard though, was that I had to teach "at a distance" now. This didn't allow me to adapt to the level of and the atmosphere during teaching in the class and the particular problems they would run into, so

At the end of a lesson, children could send in questions about the material that was taught. I saw the videos where you answered some of these questions and many of the questions asked by the children were very interesting and creative. Which question stuck with you the most?

MARTINE: In general, I was struck by the fact that several children asked really good scientific questions that are in fact being studied by biologists today. For example, they asked whether extinct species can come back somehow. This is a highly relevant question: humans sometimes try to re-create extinct species by crossing close relatives, and selecting the resulting hybrids for traits that were present in the extinct species. Also, in nature we see sometimes that new species arise that occupy the niche of an extinct predecessor – as if this extinct species "evolves again".

To conclude, one of the goals of the initiative was to introduce the children to the full width of the scientific fields, possibly so they could get inspired to pursue a scientific career themselves. Would you recommend a career in science to primary school children?

MARTINE: Of course. Intrinsic curiosity and perseverance are among the most important assets for a scientist. So, if children want to be scientists, they should go for it – they will find out about all the downsides and obstacles later, but let's not scare them off too early!

■ BY CORNÉ HOEKSTRA

In Memoriam Anne Paans (1944-2017)



On Sunday, December 17, 2017, professor emeritus Anne Paans, physicist in the Department of Nuclear Medicine and Molecular Imaging, died at the age of 73. To many of us, Anne will always be associated with the development of positron emission tomography (PET) in the Netherlands.

Between 1975 and 1991, he and the late Wim Vaalburg established, with the help of colleagues from KVI, a state-of-the-art facility for imaging research. It is true that Wim always walked in front and that Anne with his sober-minded character often preferred to keep in the background; but there can be no doubt that it was Anne's phenomenal knowledge of cyclotrons, radiotracers and, above all, cameras and their software that turned out to be decisive for the future of the Groningen facility.

In 1991, the University Hospital became a national centre for PET-research and to this very day plays a leading role in the field of molecular imaging. For BCN, the presence of the scanner meant the beginning of a new line of brain research, using modern imaging techniques like PET (and later MRI), in addition to EEG and Röntgen. Through weekly meetings at the PET Centre, Wim, Anne and Antoon Willemsen helped scientists as diverse as the late Laurie Stowe (linguistics) and the late Bert Mulder (psychology), among others, set up a long and impressive series of imaging experiments on language and selective attention.

Anne's thorough knowledge of legislation on radioactivity turned out to be a welcome addition in this respect. As a teacher, Anne participated in BCN's first Summer School on Neuroimaging (1996) and continued to give classes on imaging techniques for BCN and the Master's programme Biomedical Technology.

In 2005, Anne was appointed professor of Biomedical Technology and in 2009, he was awarded a royal decoration, becoming Officer in the Order of Orange Nassau.

Anne's contributions have been manifold; we will miss him.

■ DIEK DUIFHUIS

■ JAN PRUIM

■ FRANS ZWARTS

■ PHOTO BY JAN PRUIM

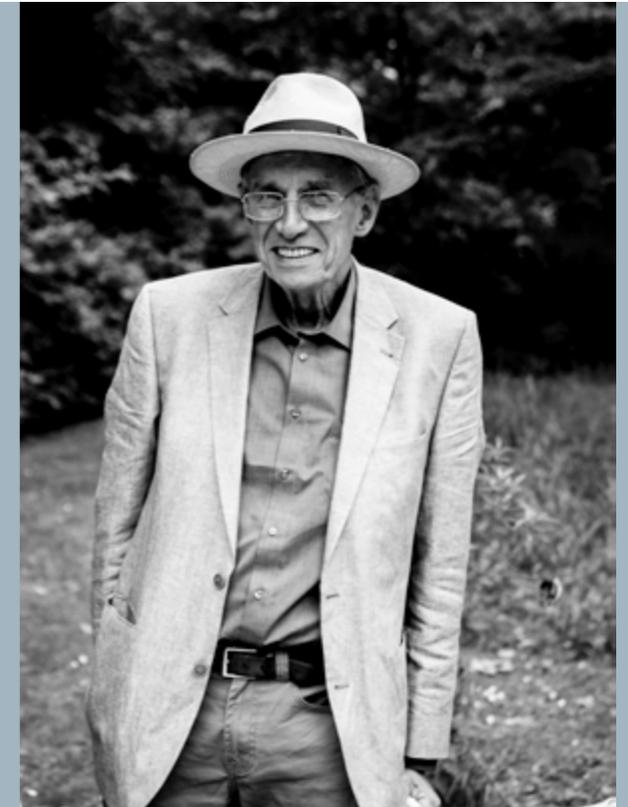
In Memoriam Serge Daan (1940-2018)

Professor emeritus Serge Daan, eminent biologist, inspiring teacher and supervisor, Knight of the Order of the Netherlands Lion, Fellow of the Royal Canadian Society, recipient of the Alexander von Humboldt Forschungspreis and the prestigious International Prize for Biology, and, last but not least, author of a marvellous biography of his teacher Jürgen Aschoff, *Die innere Uhr des Menschen*, died on Friday, February 9, 2018. To many of us, Serge will always be remembered for his fundamental contributions to chronobiology – the science of circadian rhythms, of light and darkness, of internal and external clocks. When I opened the academic year on September 4, 2006, my speech was entitled ‘The rhythm of the illustrious school’, a long-overdue tribute to Serge, his collaborators and his students. Three days later, the Japanese Society for the Promotion of Science announced that he would receive the International Prize for Biology on November 20, 2006 in Tokyo, in the presence of the Emperor and Empress of Japan. To offer you an impression of the intellectual atmosphere in which Serge and his associates studied rhythmic processes in organic nature, I quote the first few sentences of the speech he delivered when he became professor of ethology in 1997.

‘Put yourself in the position of a researcher from extra-terrestrial space who turns his telescope to the planet Earth. What would strike him first concerning those billions of two-legged individuals that are swarming over this place? He would see that they are busy in vertical position on the sunny side of the Earth but lie still horizontally on the shady side. At the border of light and darkness he sees a narrow stretch from North to South where people change from vertical to horizontal position, and the other way around. Like a gigantic ‘wave’ that moves across the rotating globe, with great precision, day in day out, century after century. And if he looks more closely, he sees numerous four-footed animals that go along with that wave. And others, the nocturnal animals, that are in an opposite phase.’

What makes this picture so impressive is that it is not only scientific, but philosophical and poetic as well. It shows that our awareness of time is inextricably bound up with the mechanical movements of the planets, but that we are also influenced by the rhythmic movements that characterise life on earth. A large part of Serge’s work was aimed at determining the rhythmic foundations of natural life.

Serge once told me that people tend to forget that one of his publications laid the foundation for the paradigm which is still dominant in behavioural ecology. Serge wrote this article, ‘The prudent parent’, in 1980, together with the late Rudi Drent. They elaborate the hypothetical thought that characteristics of the breeding process, such as the moment at which the eggs are being laid and the amount of eggs which are being laid, have evolved in such a way that the choices of the parents lead to the largest possible number of offspring. This theory had been put forward before by the Oxford biologist David Lack, who himself regarded it as rather speculative, however. I think a common thread in Serge’s scientific work is that he feels attracted to this kind of situation. How can you make the connection between a plausible, inspiring idea and reality? Theories can be complex, but they are always smooth and easy when you compare them with the ingenuity that is necessary to design good experiments, not to mention the bewildering complexity of the situations that the experimental scientist is usually confronted with. Daan and Drent found convincing empirical evidence for Lack’s thesis in the behaviour of prudent bird parents, so convincing that their paper almost immediately became one of the most cited articles in the field of ecology.



In my speech after Serge’s valedictory lecture on May 17, 2010, I said that our world appears to be characterized by rhythmic processes. We begin the day by waking up and when it gets dark, we go to bed again. In the same way, you start your academic career, you show success, and then you are told to leave until ultimately death arrives. Serge is no more, but his portrait in the Senate room of the Academic Building, painted by Gerrit Breteler, will forever be there to remind us of what he was – a giant.

■ BY FRANS ZWARTS

■ PHOTO BY LOTTE LISA PHOTOGRAPHY

It matters what is on the inside, but it never hurts to give the outside some TLC. An interview with graphic designer Ellen Beck

After you've finished the contents of your PhD thesis, you start to think about how you want your precious book to look. Getting a professional to design your thesis can help translate your message to the cover and create an easier reading experience. But what can you expect from a designer and what does this process look like? We asked Ellen Beck, who describes herself as a brainstorm junkie and alphabet fanatic. She is a graphic designer with a passion for book design and helps PhD students create their perfect thesis.

Since 2012, you've started your own business and you've been working as a graphic designer. What is the importance of a well-designed thesis? How important are the cover and layout?

Well, an interesting aspect of books is that there is a hidden hierarchy in them that acts as a guide for the reader. For example, a popular thing for theses is to put some sort of visual indicator of the different chapters on the side of the pages. Unconsciously, these little things make it clearer for the reader in which direction they have to go to. Another example is that the reading experience will be less pleasant if you have too much text on a page or text too close to the borders. If you separate pieces of text or if you do something fun with a page once in a while, you make it more accessible for the reader. Those are details that readers don't really think about, but as a designer you do. What I like about a thesis is that it has a specific theme. It is a lot of fun to think about how you can implement that theme in the cover and layout, and make a unique book.

What does the process of designing a thesis look like?

I don't have a background in science, so first I have to

understand what the thesis is about. Then there are three different phases in the design process. During the first phase, I get to know the PhD student a little bit better and we discuss the message of the thesis. Then, I create a big mind map from which I filter out the core values. These core values then point to a couple of possible directions of how these values would translate into the design. I also think it is important that the thesis is a little bit personalized and that there is a piece of the PhD student recognizable in the design. In the second phase, we discuss and brainstorm together about the different directions. After the PhD student makes a choice, I develop more concrete ideas about the form, typography and colors. I design drafts of the book (e.g., a couple of page layouts). Then, after another meeting, I start creating the book.

What can PhD students do to make the life of the designer easier?

I need some help with understanding the topic. Also, I don't know the specific rules about how the references or certain formulas should look. So, I always invite the PhD student for an afternoon just to check if those details are correct and if nothing has changed by

accident because of a different font, for example. I also like to make sure I work with the most complete version of the text available, because a single added line can move everything around. In addition, it is important that someone is open for new ideas. Then, we can always figure it out together to find the perfect form.

On your website, you mention the term slow design. Can you explain what that means?

Slow design doesn't have anything to do with slow in the sense that you are working slowly. It is the idea that you consciously think about the consequences of your choices and how you can do things differently. By giving the design process your full attention, you work with a different mindset and you can easily come up with new ideas, such as an additional loose cover that is folded in an interesting way, or a separate book cover made of a different material. It is a challenge to discover what is possible with a medium and in what innovative ways you can use paper. That is what slow design represents for me.

Visit ellenbeck.nl for contact information and examples of her work.

■ BY MANON VAN ASSELT



> MASTER STUDENT COLUMN

Finding Freud in the Brain



During my bachelor in Psychology at the University of Groningen, not much attention was paid to Sigmund Freud. During the History of Psychology course, some credit was given for the effort and courage to develop a comprehensive theory of the human mind. But alongside phrenology and behaviourism, his theory of psychoanalysis was just another failed 'grand theory' of psychology; it belonged to the past. However, in recent years, a keen interest in Freud's ideas has reemerged from a broad range of disciplines. In my opinion, the most interesting and valuable contribution comes from neuroscience. In a 2010 paper, Karl Friston and Robin Carhartt-Harris propose that 'Freudian constructs may have neurobiological substrates'¹. I should make clear from the outset that the Oedipus Complex does not have a neurobiological substrate. There are many Freudian constructs that are far-fetched, unfalsifiable or sexist, and the authors of this article make no attempt to ground these constructs in neurobiology. Their main focus is on what Freud called primary and secondary processes.

Primary processes, also referred to as the 'Id', are manifested in non-ordinary states of consciousness, such as REM-sleep, psychosis and temporal lobe aura. The free-flowing and chaotic nature of the neurophysiological processes that accompany

these phenomenological states was already anticipated by Freud, who was a well-trained neurologist. Our daily experiences, however, are not characterized by primary processes. Normally, our thoughts are more or less orderly. Freud thought that secondary processes, also called 'Ego', were there to coordinate and control primary processes. Friston and Carhartt-Harris point to the Default-Mode Network (DMN) as a possible neural substrate for secondary processes. This should come as no surprise, as the DMN occupies a unique neuroanatomical position to modulate and inhibit limbic areas and is implicated in self-referential processing.

Freud's main contributions were to psychiatry. It seemed to him that primary and secondary processes might give rise to serious psychopathologies. Friston and Carhartt-Harris point out that dysfunctional DMN activity has been associated with common psychiatric disorders, such as depression and schizophrenia, not coincidentally of main interest to Freud. For example, psychotic symptoms can be ascribed to a lack of control of the DMN over limbic areas, resulting in disordered thought processes. Conversely, withdrawal symptoms in depression could originate from an overactive DMN, resulting in rigid and self-obsessed thinking. Does this mean that we should reconsider psychoanalysis as a viable treatment option for these disorders? Not necessarily. Although Freud's ideas may have some neurobiological validity, this does not imply that he knew how to deal with a dysfunctional brain. Don't forget that Freud lived in a time when neuroscience was still in its infancy.

Linking up Freudian concepts with recent advances in neurobiology seems like an interesting and potentially useful exercise. Besides, it would not be the first time that scientists rediscover an old thinker that had some profound ideas about the human mind. For example, we now have Heideggerian Artificial Intelligence, and the idea of the mind as a prediction machine can be traced all the way back to David Hume. Admittedly, many ideas about the mind were formulated in times when the newest theories of the brain involved hydraulics. Luckily, we are able to see these old theories about the mind in the light of what we now know about the brain.

■ BY JOOST DE JONG

Joost de Jong is a first-year student of the C-track of the BCN research master. In his minor project, supervised by Hedderik van Rijn and Elkan Akyürek, he uses EEG to look for hidden states in the brain that play a role in working memory and interval perception.

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Mindwise: All we are saying is give p's a chance

Methodologists had an interesting summer this past year, thanks in part to a bombshell paper by Benjamin and 71 others, shared as a preprint on July 22nd, 2017. The authors argued to reduce the 'default threshold' α for statistical significance from 5% to 0.5% (i.e., from 0.05 to 0.005).

To refresh your memory, null hypothesis significance testing (NHST) works as follows:

- Postulate a null and alternative hypothesis (H_0 and H_A);
- Collect your data;
- Compute (using software) the p -value based on it;
- If $p < \alpha$, reject H_0 ; if $p > \alpha$, don't reject H_0 .

The p -value is the probability of finding a sample result as extreme or more extreme than the current result, given that H_0 actually is true. This implies that when there is no effect (that is, when the H_0 is true), there is a probability α of (incorrectly) rejecting H_0 . When the α level is set to 5%, which is custom the social sciences, this means that – when there was actually no effect – there's a 5% chance that you will incorrectly claim to have found one: a false positive.

If you perform a study and find a significant result, it is difficult to find out whether this result is 'real' (a true positive) or 'coincidence' (a false

positive). There are two-ways to gain additional information about which may be the case:

- Simply do the study again, based on another sample. If your original result was a false positive, it is very unlikely that your new result will again be significant. (And if you still unsure, just do the study again, and again, and again...) In the past few years, several large-scale studies – most notably OSF's Reproducibility Project – have done exactly this, and found that roughly only one-third of significant results 'replicate.'
- If you make educated guesses about (i) the probability that H_0 actually is true, and (ii) the statistical power of your experiment, then you can estimate the probabilities of a false positive, a false negative, a true positive, and a true negative. You can then estimate the *false positive rate* (FPR), or the estimated proportion of significant results that are false positives.

Method 1 requires a lot of work: you need to re-do many studies. Benjamin et al. (2017) focused on method 2. This, however, has a drawback: you have to estimate numbers without really knowing if your estimates are any good.

Benjamin showed that, for certain reasonable conditions, the FPR will be as large as 50% if $\alpha = 5\%$, which is to say that half of the significant



findings are actually false positives. When working with $\alpha = 0.5\%$, however, this FPR drops to 9%. Intuitively, this is also clear: if you make it much more difficult to claim a significant effect, it will be much less likely that you incorrectly claim a significant effect. This is the main reason why Benjamin et al. suggest lowering the default alpha-threshold by a factor of 10.

This sounds great. Let's do it!

However, there is a trade-off between false positives and false negatives: by shifting the boundary between 'significant' and 'non-significant', we reduce the FPR but increase the false negative rate (FNR). In other words: more often than before, we would fail to label a true effect as significant. This is obviously a problem too.

You can compensate for the higher FNR by increasing statistical power. For this, you need to increase the sample size. But it has to go up by a lot: you'd need 70% to 88% more participants for your study. That new standard would then eliminate a lot of labs from less-wealthy universities. And this of course comes with further problems (like the association between wealth and WEIRDness).

It's no surprise that Benjamin's paper received criticism from various sources. Some authors (Amrhein, Greenland, 2017; McShane et al., 2017) suggested to stop after the third step: if you don't draw conclusions, then you never draw false conclusions. According to them, it's not the scientist's task to decide whether the evidence to reject H_0 is strong enough. We, however, thought that this advice is impractical: sometimes you just have to make a decision.

This 'we' is a team of 84 people, led by Daniël Lakens. In a nice example of open and transparent science, we've been working on a reply in a publicly-accessible Google Document. At the time of writing, this working document contains 110(!) pages of carefully considered arguments, which was then reduced in our reply to Benjamin et al. (2017) to about 18 pages.

In this reply, we outline why holding onto a default α -level – whether it is 5%, 0.5%, or something else that we might also agree-upon and then accept as a new convention – is not a good idea. Instead, we argue that the choice should always be carefully considered. Indeed, the chosen α -level should be informed by the context.

Consider the following two situations:

1. You're studying for an exam and you want to study efficiently. You want to put in sufficient hours to pass the exam, but also no more than that: you're happy with a 6 and you would rather put the rest of your time in studying for other courses. If you fail the exam, you can do the resit in two weeks.
2. Alas, you failed the exam. You're now studying for the resit and still want to study efficiently (you have other things to do too.) But if you fail the exam this time, then you have to wait until next year for another attempt. And this study delay costs you another year of tuition fees, as well as the ire of your parents.

In both cases, a false positive would be thinking you had spent enough effort on the course, while still failing the exam. It is clear that the consequences of that are much bigger in the second example than in the first, so you will decide in advance to put in some extra effort to make sure that the false positive probability is smaller in case 2 than in case 1.

You should set your α to a stricter level when the stakes are higher.

The same line of reasoning holds in NHST. You can interpret your α -level roughly as "How bad is it if I accidentally (and incorrectly) call for an effect in this study?" It is not logical to give the same answer ($\alpha = 5\%$) to this question in every situation. You should justify your decision.

When the stakes are high, use a small α . When they are low, use a larger one.

This doesn't sound like a groundbreaking suggestion. But that's because it isn't: mathematical statisticians have been saying this since the birth of NHST.

More than 50 years ago, Sir R. A. Fisher himself said much the same thing: "no scientific worker has a fixed level of significance at which, from year to year, and in all circumstances, he rejects hypotheses; he rather gives his mind to each particular case in the light of his evidence and his ideas" (see Lakens et al., 2017, p.14). As the

urge is so strong to hold on to default values, rather than to put in an effort to motivate specific choices, it is good to remember where the defaults came from.

Our p's are contemporary conventions, and nothing more. We don't need to ban them. We just need to be a bit smarter about how we use them.

■ BY CASPER ALBERS

■ ILLUSTRATIVE PHOTO BY SANDER MARTENS

Originally published by [Mindwise](#)

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Casper Albers received his MSc and PhD in mathematical statistics in Groningen. After a four-year research position in England, he returned to Groningen, where he is now associate professor in statistics at the Faculty of Behavioural and Social Sciences. His research concerns the development of statistical models for behavioural and social data. The main focus is on advocating the use of measurement-intensive longitudinal data in psychological studies. Such designs are essential for understanding psychological processes, rather than just static outcomes. Studying interindividual differences is interesting, but studying the intra-individual differences often provide much more insights. Furthermore, Casper is interested in the use (and misuse) of statistical reasoning. With publications in peer-reviewed and popular scientific outlets, he hopes to improve statistical practice.

Mindwise: Fear and trembling in Groningen

For the past few years, Katherine Stroebe, Babet LeKander, Justin Richardson and a host of colleagues inside the department, in collaboration with external partners, have been accumulating a wealth of data to document the societal impact of the earthquakes induced by gas extraction. In this piece, I go beyond the evidence itself and offer an opinion on the safety policy in Groningen. There are three aspects of safety for residents in the region:

- what those residents tell us, in our research, about the threats to safety that they feel exposed to and (as shown by our studies) suffer from
- what the “real” and relevant safety risks are according to safety experts
- what the hidden risks and costs are for the solution that the government is implementing to safeguard safety

Background

Groningen suffers from earthquakes and rumoured soil instability due to gas extraction. For a long time, this was neglected and denied: the magnitude of the earthquakes looks reassuringly small on paper. (Most of them are no more than 2.5 or so. The biggest one was a magnitude 3.6) Geologists simply could not believe the rumours of damage. But the combined impact of many small earthquakes

(there have been over a thousand) has been huge. Moreover, the earthquakes happen at a very shallow depth and the impact is enlarged by the fact that the top soil in the low countries is so boggy: a tsunami-like wave is thought to be responsible for a lot of the damage. The fact is that, so far, an estimated 100.000 instances of damage to homes and property have been reported. The fact is that over one billion euro has been spent on repairs. The major concern is: the number of earthquakes is set to increase and their magnitude might too.

The real risks

In our research, residents paint a disturbing picture of the profound misery that occurs when one’s home is damaged time and again. A lot of this suffering and stress takes place behind people’s front doors – for years it remained hidden to the public eye. In some sense, these are “only self-reports”. But in those self-reports, we see a disturbing pattern: the damage and the continuous uncertainty cause stress. The trust in the involved authorities and governmental organizations is steadily decreasing. The magnitude of the problem is alarming (for more information, visit <https://ggd.groningen.nl/onderzoek/gezondheidsprofiel/aardbeving-en-gezondheid-2016>): 8,000 residents suffer from health complaints due to the damage, 4,000

suffer from poor health and 2,000 are at a high risk for anxiety or depression disorders. Why are these statistics so high? It is because 130,000 adult residents of Groningen have experienced some damage to their homes, of which 70,000 have had experienced damage twice or more. This damage will continue to increase and is too often not resolved: people feel highly unsafe. Twenty-five percent of the residents in Groningen no longer report the damage: they think there is no point in doing so or they “save up” their damages for the next earthquake. That is how much trust has deteriorated.

What do these statistics mean? What will happen to the thousands of people that suffer health complaints and psychological distress? The cause is a chronic one. Bit by bit, through hundreds of small earthquakes and other soil movement, buildings and people become damaged. Because such a large number of people have been affected by the damage, it is inevitable that a large number of serious complaints will develop. These complaints are so serious that it is to be expected that this will cost lives. We know several stories about cardiovascular disease, burnout, and instances of suicide. That these issues can lead to higher mortality rates is yet to be proven (and evidence is what counts in science), but I do not think it is responsible to ignore these signals.

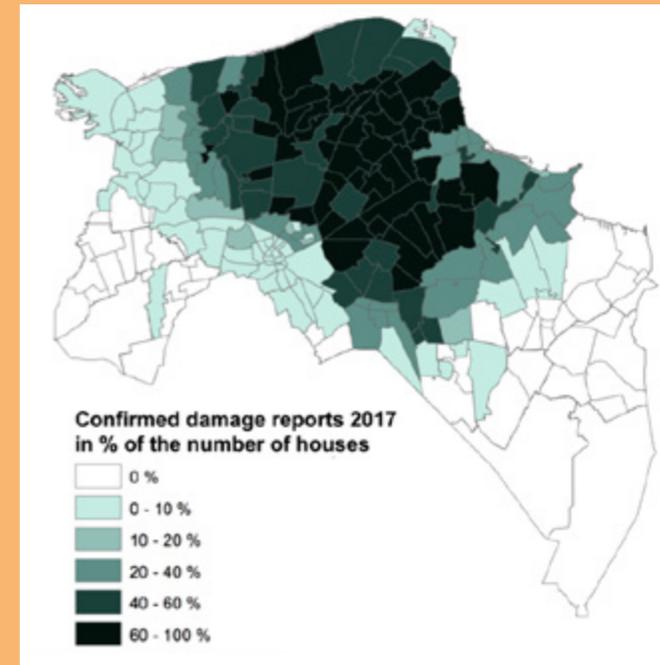


Figure. The gas extraction affects virtually the whole province of Groningen. The health monitor reports that 134.363 adults have damage (around 170.000 people if you include children). Source: GGD Health Monitor. Postmes et al. (2017).

I am now convinced that it is appropriate to call this a disaster. The spatial scientist Marten Hoekstra recently wrote an excellent master’s thesis on the topic (for more information, visit <https://www.rug.nl/research/sustainable-society/news/2017/winnaarsusoscriptieprijs>). His conclusion: it is a disaster by national and international standards, partly because the

problem is huge (130,000 residents' homes were damaged within 5 years and 70,000 residents faced this multiple times) and because the institutional response is inadequate: normal life is severely disrupted by all this. However, because the damage is being done in such a gradual way, over such a long time span, we do not see the shocking images that one expects to see when the word disaster is used.

The paper risks

The government's policy is to put "safety first." But what does "safe" mean in their approach? The current policy definition of safety does not take into account how many people fall ill or are ruined by the damage – to all practical purposes these traumatic experiences are irrelevant for its safety policy. The only real risk that is currently taken into account is if residents of Groningen die from collapse of a building, for example due to an exceptionally strong earthquake. If the probability of dying in this way is less than 1 in 100,000, then people are presumed to be "safe." These are the thresholds that the government has agreed by law. These laws set the boundaries within which Shell and Exxon, who extract the gas in a joint venture called NAM, must operate. Within their confines, NAM determines how safe their mining of gas is. Against these legal requirements, the government must judge NAM's proposals.

Within this context, "Safety first" means a form of safety in which the actual experiences of residents and the actual damage inflicted are irrelevant. In these models, only the theoretical safety of buildings is important. If the government says "safety first", this means that it takes responsibility to protect the population of Groningen from risk of collapse. This has the surreal consequence that whilst research shows that the psychological impact is increasing, Groningen was (at least until the latest earthquake of January 8, 2018, in which g-forces of 0.12 were registered) becoming increasingly safe on paper. On that basis, the minister, parliament and senate reached the conclusion in 2017 that the level of gas extraction would be safe and good to go for the next five years.

Even within the limited thresholds for risks of collapse, the predictions for Groningen are far from hopeful. Additional measures have had to be put in place to safeguard houses from collapse. Central to this is that houses are strengthened. According to NAM's plans, hundreds of houses need reinforcement. The minister who is responsible (Kamp) promised to strengthen 8,000 in 2015 and 2016, but until last September they had carried out only 561 reinforcements. They also carried out 4,567 inspections so far. From the results, it appears that almost all inspected houses have to be strengthened. In a considerable proportion of cases (maybe half) the expectation is that it

would be much cheaper to demolish and build from scratch. In the area that is most badly affected, there are more than 65,000 homes. In the total area, about 200,000 might be affected. Where will this end?

In sum, the government prefers to focus on a form of safety that is assessed through highly complex models based on all manner of assumptions about future earthquakes, soil composition and the strength of buildings: even though computers do all the computations, it is essentially a paper-and-pencil assessment that ignores the verifiable consequences of earthquakes (homes damaged, people stressed and unsafe) in favour of models of future forecasts. The consequence is that government has decided on large-scale reinforcement. That has become the main task of the National Coordinator for Groningen. In order to continue to extract gas at the current level, the reinforcement must be rapid and large-scale. That will cost billions of Euro's, but still much less than it yields. The real disaster, described above, has faded into the background because all the attention is focused on reinforcement (as well as demolition and rebuilding) as the top priority.

The disaster to come

The immense reinforcement, demolition and rebuilding task is intended to reduce the risk of the collapsing of buildings. However, I doubt

that this reinforcement reduces the real risks for residents. I expect the opposite: through reinforcement, residents may end up with a higher risk than before.

What is the reason for this gloomy assessment? As mentioned, many thousands of homes have to be reinforced. That is a huge task that, even if the pace will increase tenfold, lasts for more than ten years. The further the inspections and reinforcements progress, the clearer it becomes that people who live in unreinforced homes might be unsafe. It makes sense that they also start to feel less safe. It is precisely this stress and uncertainty that has been proven to make people sick.

Perhaps it is even more important that residents of those homes that are already being reinforced appear to be unhappy: in fact they appear to be severely burdened by it all. Inspection, relocation and reconstruction are very stressful life events that carry their own risks for health and well-being, that can put social relationships under strain and that expose residents to direct or indirect financial risks. In the paper-and-pencil sketch of risks to residents, only the benefits of reinforcement are taken into account. These reinforcements decrease risks of collapse. The costs for the population are, yet again, not taken into account in the government decision making.

Conclusion

In essence, I argue this: the Minister of Economic Affairs and Climate ignores an existing disaster. Instead, he attempts to prevent a paper-and-pencil disaster, but in order to achieve that he imposes a measure on the region that may well prove to be disastrous in its own right. Based on our research and this interpretation above, my own thinking is that we are solidly stuck. I do not know the solution for this sorry situation, but my firm belief is that one should at least concentrate on what is now known for sure: the evidence of the misery surrounding the damages is accumulating and currently no one is dealing with it. In whatever policies are adopted, the real disaster should not be forgotten. Furthermore, in decisions whether or not to reinforce, I would take into account not just the indirect benefits for safety (and the continuation of gas extraction), but also the direct risks for residents.

Further information about the research and publications can be found on www.groningsperspectief.nl

■ BY TOM POSTMES
■ TRANSLATED FROM DUTCH BY IRIS MEINDERTS.

Originally published by [Mindwise](#)



Tom Postmes studies human behaviour in virtual groups and communities, in crowds and also organizations and “normal” teams. Central to a lot of his work is the influence of personal and social identity: the relation of the individual to the group. Together with his colleagues, Tom Postmes seeks to understand how social interaction fosters the emergence and change of group norms, personal identity and social identity. He received various research awards for his work from the Royal Netherlands Academy of Arts and Sciences (KNAW), the Dutch National Science Foundation (NWO), the Economic and Social Research Council (UK) and National Science Foundation (USA). Recently, he has been investigating social-psychological responses to the earthquakes in Groningen and more broadly “social unrest” in the Netherlands

Intro new staff writer

> **NENA LEJKO**



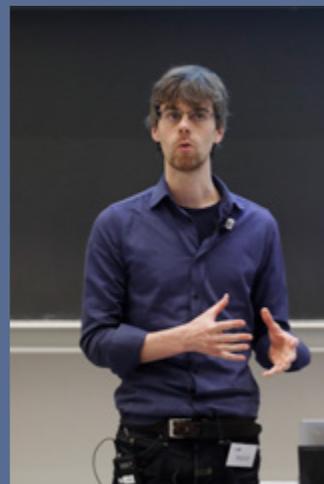
I started in the basement of the NeuroImaging Center around this time last year, working on my minor project for the BCN Research Master. There was a plant in our office that, against all odds, survived the less-than-ideal care and environment. Summer came and we left, and on one of those windy Dutch days, I took the plant home. Between exams and thinking about my master thesis, a project on using transcranial brain stimulation to improve cognitive impairment in the elderly found me. I am now both finishing my master’s degree and starting a PhD. Investigating the ageing brain is not just about disease, but it is also about health and everything in between. The leaves at the bottom of my plant’s stem die off, and new ones are born on top. One day it will wilt, but for now it defies the fact that I am not much of a gardener. If I planted it in a larger pot and exposed it to more sunlight, the plant would grow taller. The brain remains plastic throughout life, and with longevity increasing, it is now time to learn how it can be nurtured to not only prolong life, but also improve its quality. Having just started my PhD, I get a lot of questions about what I do and why. Some I have yet to find answers to. The BCN Newsletter gives me an opportunity to meet the people I walk past in hallways and see in offices, learn about what they do and why, and perhaps find some answers of my own.

■ PHOTO BY SANDER MARTENS

Winter meeting

On February 1st the BCN Winter Meeting took place. An impression...

■ PHOTOS BY SANDER MARTENS AND MICHEL HOOIVELD

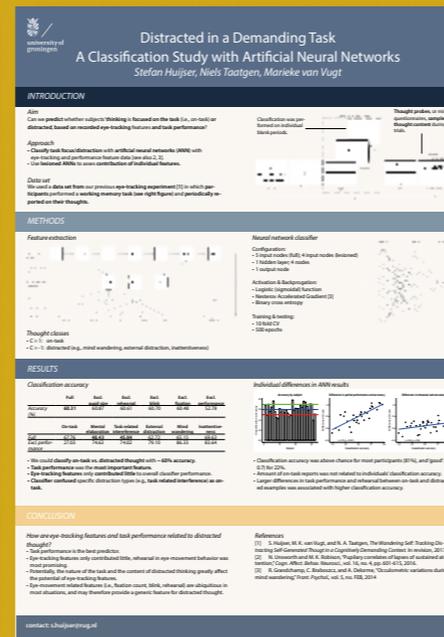
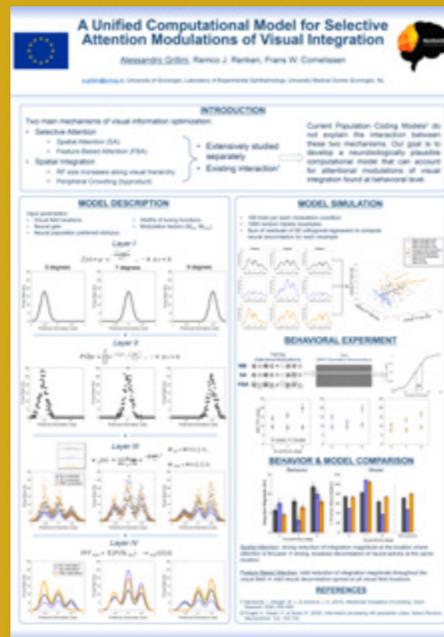
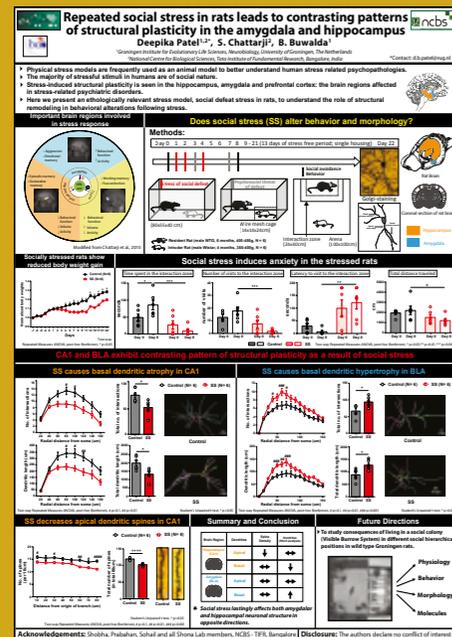




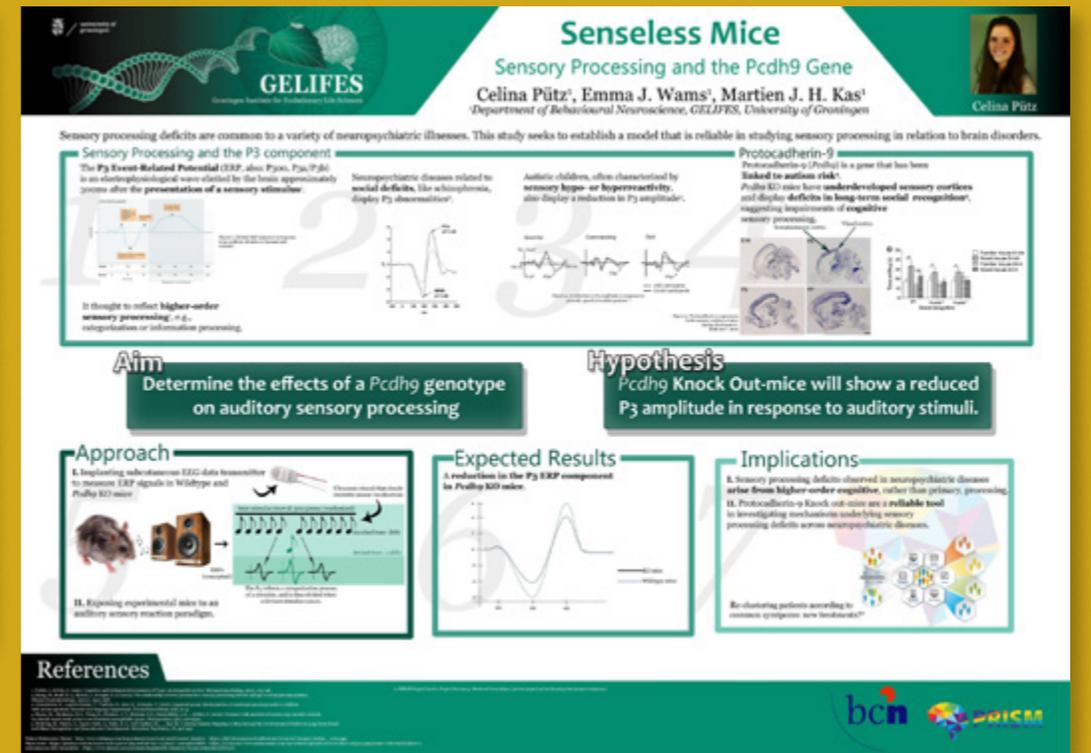
Winning Posters

What does it take to create a great poster? You might take some inspiration from these winning posters, which were selected as the best Master (on the right) and PhD posters presented during the BCN Wintermeeting on February 1st!

Winning PhD posters



Winning Research Master poster



Intro
new
staff
writer



> **JAIME MONDRAGON**

As a thirteen-year-old boy, I wanted to be a physician turned social revolutionary like Ernesto Guevara. As an undergraduate student, I wanted to be librarian turned novelist like Jorge Luis Borges. Age, responsibility and nine years of medical indentured servitude yielded an aspiring economist the likes of Yanis Varoufakis and Joseph Stiglitz. I consider myself a neuroscientist by day and a librarian by night. My grandmother Lupita used to say, "Learn to read so you can understand the Holy Book and learn to count your coins". She was right; I have loved every "Holy Book" I have ever read, from *The Cell* to *El ingenioso hidalgo don Quijote de la Mancha*, and landed in a surplus economy like the Netherlands. I look forward sharing my opinion and views with the readers of the BCN Newsletter.

The scoop: I am a Mexican immigrant, raised in San Diego, California. I did my undergraduate studies at UC Berkeley (double majored in Spanish literature and biology), and medical training in Mexico (UNAM), with a M.Sc. in neurobiology (UNAM). I'm currently a second-year Ph.D. candidate, and member of the Alzheimer Research Center and the Clinical Neuroengineering Group in the Neurology Department. I'm working on neuroimaging biomarkers for cognitive decline.

■ PHOTO BY MICHELLE MEIJER

Intro
new
staff
writer



> **VALERIA CERNEI**

Embracing the inherent uncertainty in the scientific quest and committing to a life-long process of ethical and systematic (re)searching may just be the two components that any scientist starter pack (which you can order at www.howtobecomeascientist.com) should include. I got mine around three years ago, in my first year of a bachelor's programme in psychology at RUG. Now in my third year, I am still amazed by the impact that such an outlook has. The questions keep multiplying, and I do love myself a good question! Almost as much as I love searching for answers. As for the questions, they have recently revolved around various cognitive processes such as perception, memory and learning, both at the level of their corresponding neural substrates and, more generally, as evolved mechanisms in a dynamic system that shapes one's reality. In this context, I am excited about working on several captivating projects in the following months, including completing my bachelor's thesis, conducting a research internship under the supervision of Sander Martens, organizing debates for Mindwise, and writing for the BCN newsletter. Working on my bachelor's thesis under the supervision of Hedderik van Rijn will give me the opportunity to explore various ways of improving adaptive learning algorithms, while the research internship will allow me to gain insights into inter-brain activity coherence and get acquainted with hyperscanning using EEG and NIRS. Moreover, I will continue organizing the Mindwise debates event series, which are a chain of public debates in which mixed teams of students and researchers participate. Finally, I am excited to be embarking on board of the BCN newsletter, which I expect to fuel my passion for both writing and science.

■ PHOTO BY SANDER MARTENS

Cool links

- > Artificial neurons compute faster than the human brain
<https://www.nature.com/articles/d41586-018-01290-0>
- > Build-a-brain. Actually, build-retinal-neurons would be more accurate, but it just doesn't have the same ring to it.
<https://eyewire.org/explore>
- > Build a brain and break it down. Rendering techniques used to bring together reality and the world of magic are now being utilised to build 3D virtual models of the brain that can be taken apart and even dissected.
<https://www.scientificamerican.com/article/technology-from-harry-potter-movies-brings-magic-of-brain-into-focus/>
- > Will Big Brother soon be able to not only see us seeing, but also see what we saw? In one episode of Black Mirror, insurance companies used a Recaller, a device capable of reading and visualising human (and hamster) memories. In real life, Japanese scientists are attempting the same.
<http://www.iflscience.com/brain/artificial-intelligence-recreates-images-from-inside-the-human-brain/>
- > Scientists of the future might in fact be able to help us recall memories we thought were lost. Research on mice showed that encoded but forgotten memories remain stored in the brain as connectivity patterns and can be triggered optogenetically.
<http://news.mit.edu/2017/neuroscientists-build-case-new-theory-memory-formation-1023>
- > We may not want to look like the naked mole rat, but we certainly want to age like one. A mole rat-like human might be able to defy Mother Nature by resisting cancer and living 5 times past their expected age.
<http://www.sciencemag.org/news/2018/01/naked-mole-rats-defy-biological-law-aging>

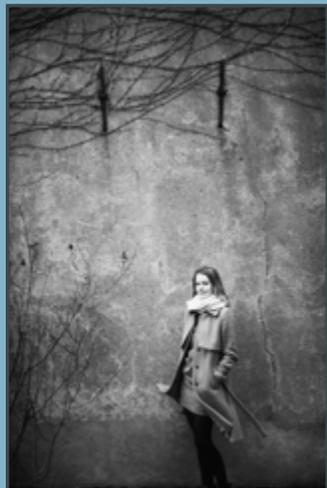
<http://www.wwww>

New staff writers wanted!

Do you enjoy reading the Newsletter?
If so, why not join our enthusiastic editorial team
and make it even better?

Regardless of whether you're a master student or PhD student,
it's a great way to expand your network,
improve your English writing skills, and be actively involved in BCN.

Interested?
Send an e-mail to
Sander Martens,
sander.martens@gmail.com!



> GRAND STUFF

Teacher of the year (x3!)

Hedderik van Rijn has recently been proclaimed the Teacher of the Year BCN Research Master, Teacher of the Year Psychology, and Teacher of the Year GMW.

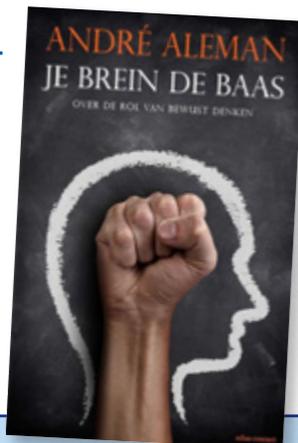


■ PHOTO BY
SANDER MARTENS

New book 'Je brein de baas'

Following his previous best-seller 'Het senioren brein', André Aleman's new book focuses on the importance of conscious thinking. Whereas unconscious processes are known to determine much of what we do, André argues that all control is not lost; conscious processes have a say in it as well and are therefore a force to be reckoned with.

<http://www.atlascontact.nl/boek/je-brein-de-baas/>



ERC Grants for Ming Cao and Catarina Dutilh Novaes

Both Ming Cao and Catarina Dutilh Novaes, University of Groningen researchers, have been awarded with ERC Consolidator Grants. The European Research Council (ERC) awards these personal grants, each worth € 2 million, to outstanding scientists, stimulating ground-breaking research in Europe.

<https://www.rug.nl/news/2017/11/erc-beurzen-helpen-drie-rug-wetenschappers-naar-de-top>
https://www.rug.nl/news/2017/11/hoelaa-je-robots-%28en-mensen%29-samenwerken_



Catarina Dutilh Novaes

■ PHOTO BY
UNIVERSITY OF
GRONINGEN



Ming Cao

■ PHOTO BY
UNIVERSITY OF
GRONINGEN

Nico van Yperen first Professor of Sport Psychology in the Netherlands

How do you recognize talent and creativity? Which psychological factors and circumstances affect enjoyment and performance in sport? How can the mental aspects of sport and performance be further exploited? These are the key questions that **Nico van Yperen**, newly appointed Professor of Sport and Performance Psychology at the University of Groningen, will address. Van Yperen is the first professor in the Netherlands whose prime focus is the psychology of sport and performance.
<https://www.rug.nl/news/2017/12/nico-van-yperen-first-professor-of-sport-psychology-in-the-netherlands>



■ PHOTO BY UNIVERSITY OF GRONINGEN

ECR Lunch on Mentoring

On November 22nd, the Young Academy hosted a very successful ECR Lunch on mentoring. The goal of this lunch was to exchange ideas and knowledge on what a mentor can do for you, how the University of Groningen can help and how to make a plan for a successful mentoring relationship.

https://www.rug.nl/news/2017/12/looking-back_-ecr-lunch-on-mentoring



■ PHOTO BY UNIVERSITY OF GRONINGEN

> PHD AND OTHER NEWS

PhD and other news

The winner of the BCN Dissertation Award 2016-2017 is Meghan Laturney. Her dissertation, entitled "The Second Sex. Functions and mechanisms of sperm manipulation in female *Drosophila melanogaster*", was chosen as the best of 8 nominations. Meghan Laturney was a PhD student at GELIFES. Jean-Christophe Billiter was her promotor.

The committee also considered the theses of Dennis van der Meer and Burcu Arslan to be excellent BCN dissertations!

Winner of the BCN Summary Award

Florian Sense won the BCN Dissertation Summary Award 2016-2017. It was the last year that the BCN Summary Award was awarded. Instead, it will be replaced by a new award for the best article. Information will follow soon.

Winners of the BCN Poster Awards

Stefan Huijser, Alessandro Grillini and Deepika Patel won the BCN Poster Awards. The poster by Celina Pütz was selected as the best Research Master poster. Curious to see them?? On [page 23](#) of this newsletter you will find their posters.

BCN Symposium

Please block off June 21 and 22, 2018 from 8:30-12:30 in your agendas for the BCN Symposium "Research and Rhythms". The symposium is part of the 30th international, annual meeting of the Society of Light Treatment and Biological Rhythms (SLTBR), which is hosted by the University of Groningen on June 21-24, 2018. The programme is a balanced mix of basic and translational science, and clinical applications on rhythms, light pathways and mood disorders. Note that last year, three researchers won the Nobel Prize in Physiology and Medicine 2017 for the discovery of the molecular mechanisms controlling circadian rhythms!

Invited speakers: Bill Schwartz, Samer Hatter, Peter Meerlo and Robert Levitan

BCN Statistics Course

On June 11, 12, 13, 14 and 18 from 10:00-14:00, BCN will offer the BCN Statistics Course. Topics to be covered in the course include: introduction to R, data exploration, various statistics tests in R (t-test, ANOVA, non-parametric alternatives), linear regression and logistic regression, mixed-effects regression (multilevel modeling), and generalized additive modeling (non-linear regression).

Agenda BCN Activities:

March 8 and 9, 2018

BCN Retreat

June 11, 12, 13, 14 and 18, 2018

BCN Statistics Course

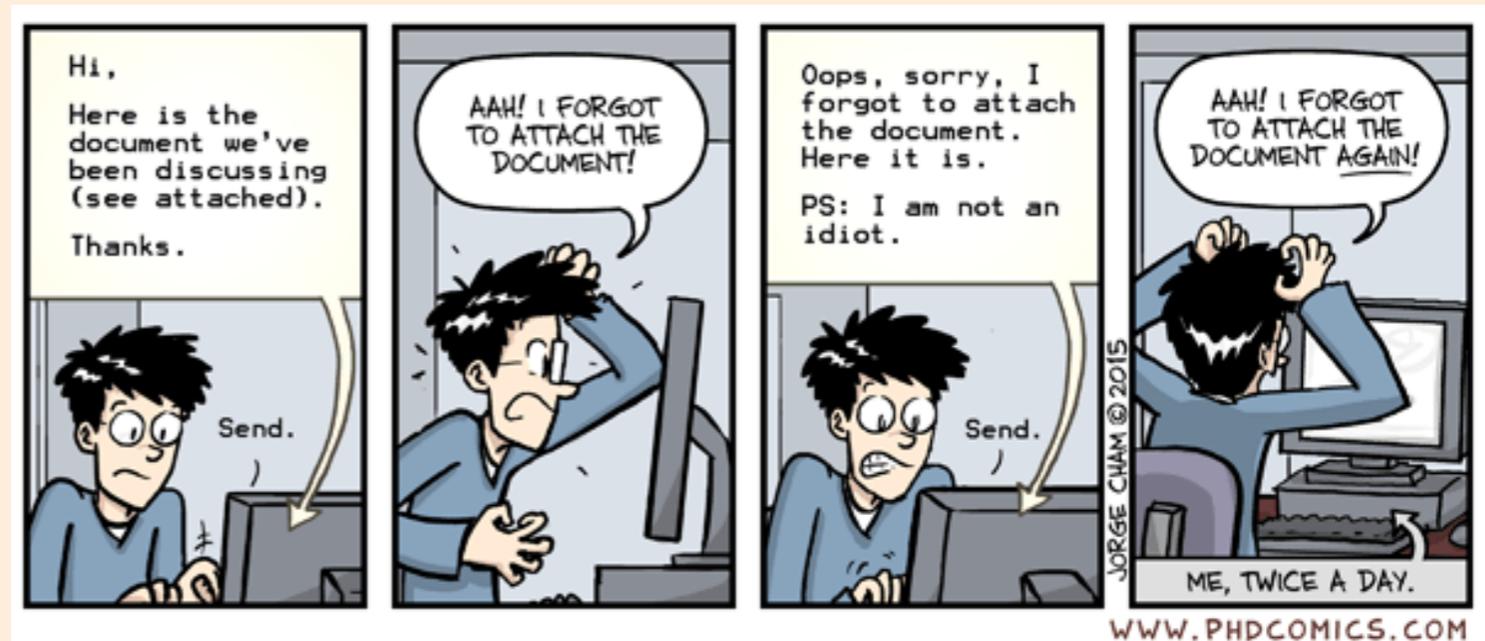
June 21 and 22, 2018

BCN Symposium Research and Rhythms

Course application: <http://cursus.webhosting.rug.nl/gsms>

Please check the website for more detailed information.

■ BY DIANA KOOPMANS



> PROMOTIONS

Understanding negative symptoms: Neuroimaging insights into the neurocognitive basis of negative symptoms in schizophreⁿi

P H D S T U D E N T

N.G. Klaasen

T H E S I S

Understanding negative symptoms:
Neuroimaging insights into the neurocognitive
basis of negative symptoms in schizophreⁿi

P R O M O T O R

Prof.dr. A. Aleman

C O P R O M O T O R

Dr. E.M. Opmeer

F A C U L T Y

Medical Sciences

Negative symptoms are prevalent in people with a psychotic disorder, but they also occur in other psychiatric and neurological disorders, as well as in otherwise healthy people. Negative symptoms can be divided into expressive deficits and amotivation. Amotivation, especially, has a strong association with unfavorable outcomes and reduced quality of life. Therefore, treatment of negative symptoms, most notably amotivation, is of great importance. Unfortunately, current treatment options for negative symptoms are lacking, in part because the neural processes underlying negative symptoms are largely unknown.

In this thesis, several processes were studied that may be disrupted in people with negative



■ PHOTO BY SANDER MARTENS

symptoms, focusing mainly on amotivation and its constituent symptom apathy. Amotivation is characterized by a reduction of goal-directed behavior. Processes underlying goal-directed behavior that could be disrupted in amotivation include reward sensitivity, cognitive flexibility, and self-initiation. In this thesis, we examined whether activation and cooperation of brain areas involved in these processes is altered in people with negative symptoms. Our results showed that brain areas involved in reward processing and flexibly allocating attention are

less active in people with negative symptoms. Additionally, cooperation between brain areas involved in reward processing and the anticipation of positive events was reduced in people with negative symptoms. These findings may contribute to the understanding of negative symptoms and to the development and improvement of treatment for these symptoms.

Nicky Klaasen (1987) was promoted on November 1, 2017.

Neuroimaging in tremor and functional motor disorders

P H D S T U D E N T

M. Broersma

T H E S I S

Neuroimaging in tremor and functional motor
disorders

P R O M O T O R S

Prof.dr.ir. N.M. Maurits

Prof.dr. M.A.J. de Koning-Tijssen

C O P R O M O T O R

Dr. M. van Beilen

F A C U L T Y

Medical Sciences

This thesis is about two disorders with motor symptoms, with different origins and manifestations. What all disorders with motor symptoms have in common is that there is a deficit in the movement system, often caused by altered brain functioning.

Essential tremor (ET) is a common type of movement disorder in the category of too much movement and is characterized by a bilateral action tremor, occurring during posture and movement. By recording electromyography (EMG) and functional magnetic resonance imaging (fMRI) simultaneously, we were able to link tremor activity directly to brain activity. With the use of this innovative technique, we identified brain activations specifically associated with variations in tremor intensity in essential tremor patients in the cerebellum.

>> CONTINUATION PROMOTIONS



■ PHOTO BY HENK VEENSTRA

In the second part of this thesis, we studied functional neurological paresis (FNP), a functional motor disorder in the category of lack of movement. FNP is a functional neurological symptom disorder with loss of muscle strength as its core symptom. We examined the potential value of repetitive transcranial magnetic stimulation rTMS as a therapeutic tool in FNP and the effect of rTMS on neural activity with fMRI. We established that rTMS can be a potential therapeutic application for patients with FNP. The patients with FNP showed large variability in neural activation

patterns after treatment with rTMS, illustrating that understanding the mechanisms involved remains difficult.

Marja Broersma (1985) was promoted on November 1, 2017.

Down & Alzheimer: Behavioural biomarkers of a forced marriage

PHD STUDENT

A.D. Dekker

THESIS

Down & Alzheimer: Behavioural biomarkers of a forced marriage

PROMOTORS

Prof.dr. P.P. de Deyn

Prof.dr. M-C. Potier-Zelveyan

FACULTY

Medical Sciences

Dementia is a major challenge in contemporary intellectual disability care. People with Down syndrome have an exceptionally high genetic risk to develop Alzheimer's disease: 50-80% develops the disease. Remarkably, whereas dementia symptoms present early in the one person, the other remains free of symptoms until late in life. Who will develop dementia, and who will not (yet)? Predicting the disease progression is particularly difficult in this population. Comprehensive evaluation of behavioural and psychological symptoms of dementia may aid. Besides cognitive decline, dementia is characterized by behavioural changes. Studies in the general population have shown that specific changes already present before the diagnosis is established. As such, behavioural changes may serve as early alarm signals for (approaching) dementia. Surprisingly, these changes have hardly been studied in people with Down syndrome. This dissertation focuses on behavioural changes and underlying alterations in neurotransmitters in the brain. Next to biological results, this

dissertation presents the important findings in a unique, large European behavioural study in 281 people with Down syndrome with and without dementia. Using the newly developed BPSD-DS scale, it was shown that the frequency of anxiety, sleep problems, agitation, aggression, apathy, depressive symptoms and eating/drinking problems evidently increases in the group with dementia. Among those with questionable dementia (a kind of prodromal



■ PHOTO BY JENNE HOEKSTRA

>> CONTINUATION PROMOTIONS

stage), a substantial number already showed an increase in anxiety, sleep problems, apathy and depressive symptoms – possible early alarm signals. Early identification is of utmost importance for adaptation of daily care and to enable therapeutic interventions to increase the quality of life.

Alain Dekker (1991) was promoted on November 15, 2017.

Glaucoma care optimised in an ageing population

P H D S T U D E N T

C. Wesselink

T H E S I S

Glaucoma care optimised in an ageing population

P R O M O T O R S

Prof.dr. N.M. Jansonius

Prof.dr. J.M.M. Hooymans

F A C U L T Y

Medical Sciences

With an estimated number of 64.3 million people having the disease worldwide, glaucoma is the leading cause of irreversible blindness. Glaucoma is a disease of the optic nerve, in which nerve fibers loss leads to visual field loss. The most important risk factor for having the disease is a high intraocular pressure. Age is another well-established risk factor and with a growing elderly population worldwide, it is estimated that the number of people with glaucoma will to 112 million in 2040. Thus, the need for glaucoma care will increase.



■ PHOTO BY BART UFKES

In this thesis, opportunities to optimise glaucoma care are investigated. A novel algorithm is described to easily analyze a series of visual field examinations for glaucoma progression. Risk factors for glaucoma progression (higher age, higher intraocular pressure and more advanced disease stage) are described. Visual field testing can be challenging for patients and ways to improve testing strategies and alternatives to visual field testing are investigated. Furthermore, it is described if elderly glaucoma patients can be monitored or treated less intensively than their younger peers. Since glaucoma is a slowly

progressive disease, this is true for patients aged over 80 years with early glaucoma.

Christiaan Wesselink (1983) was promoted on November 22, 2017.

Molecular heterogeneity and angiogenesis in glioblastoma

P H D S T U D E N T

S. Conroy

T H E S I S

Molecular heterogeneity and angiogenesis in glioblastoma

P R O M O T O R S

Prof.dr. W. Timens

Prof.dr. F.A.E. Kruyt

C O P R O M O T O R S

Dr. W.F.A. den Dunnen

Dr. K.P. Bhat

F A C U L T Y

Medical Sciences

The aim of this thesis was the assessment of the differential molecular characteristics and functional responses of glioblastomas with dissimilar phenotypes. The characteristics of transcriptional subclasses were studied in detail through the definition of molecular subclasses at protein level and the assessment of kinase activity profiles and vascularization patterns. In addition, the plasticity or interchangeability of these molecular phenotypes was studied, and the second part of the thesis then focused on the role of angiogenesis in glioblastoma in general. The thesis concluded with the exploration of the druggability of the vascular compartment in glioblastoma.

Siobhan Conroy (1987) was promoted on November 27, 2017.

>> CONTINUATION PROMOTIONS

α -Synuclein pathology and mitochondrial dysfunction: Studies in cell models for Parkinson's disease

P H D S T U D E N T

K.C. van Zomeren

T H E S I S

α -Synuclein pathology and mitochondrial dysfunction: Studies in cell models for Parkinson's disease

P R O M O T O R

Prof.dr. H.W.G.M. Boddeke

C O P R O M O T O R

Dr. J.C.V.M. Copray

F A C U L T Y

Medical Sciences

The development of Parkinson's disease (PD) is linked to mitochondrial dysfunction in dopaminergic (DA) neurons of the ventral midbrain. Etiology of the disease remains poorly understood and the link between mitochondrial dysfunction and the disease-causing protein α -synuclein remains elusive. Using an SH-SY5Y overexpression model, we show α -synuclein A53T significantly inhibits mitochondrial trafficking and leads to an increase reactive oxygen species production. Treatment with davunetide, a microtubule stabilizing peptide, rescues this phenotype. To confirm these results in human induced pluripotent stem cell derived neurons, we first introduce a purification system based on the metabolic profile of neuronal cells. Using glucose deprivation and lactate supplementation, we efficiently enrich neuronal populations. Using a long-term (90 days) culture approach, we subsequently

analysed mitochondrial trafficking in cultured dopaminergic neurons.

We demonstrated that mitochondrial trafficking is impaired in PD neurons when compared to control neurons, and that mitochondria are frequently fragmented in patient-derived DA neurons. These results support the findings in the SH-SY5Y overexpression model and suggest that mitochondrial fragmentation and impaired trafficking are early events that contribute to mitochondrial dysfunction in PD. A major hurdle in the implementation of pluripotent stem cells is the rejuvenated phenotype of differentiated cells. To overcome this hurdle, we introduced an in-vitro model to accelerate ageing of iPSC-derived somatic cells using transgenic expression of progerin. Differentiated cells that express progerin displayed several hallmarks of ageing, including nuclear folding, chromosomal instability and mitochondrial dysfunction. This technique presents the stem cell community with additional tools to study ageing differentiated cells.

Koen van Zomeren (1985) was promoted on November 27, 2017.



■ PHOTO BY ANDERS JENSEN URSTAD

Structural and neurochemical correlates of Tourette's disorder and attention-deficit hyperactivity disorder

P H D S T U D E N T

J.N. Forde

T H E S I S

Structural and neurochemical correlates of Tourette's disorder and attention-deficit hyperactivity disorder

P R O M O T O R S

Prof.dr. P.J. Hoekstra

Prof.dr. J.K. Buitelaar

C O P R O M O T O R

Dr. M.P. Zwiers

F A C U L T Y

Medical Sciences

Tourette's Disorder (TS) and attention-deficit/hyperactivity disorder (ADHD) are common childhood onset disorders that commonly occur together. What areas of the brain are involved in these disorders is still unclear, but a set of brain networks connecting certain cortical and subcortical regions is thought to be involved in both, namely the cortico-striatal-thalamo-cortical (CSTC) networks. This thesis set out to determine the unique and common neurobiology of the disorders, and focused on the neuroanatomy and neurochemistry of these networks.

>> CONTINUATION PROMOTIONS

We examined magnetic resonance imaging scans from children between 8 and 12 years old with TS and/or ADHD and healthy comparison children.

We found that the structure of the networks did not relate to either disorder. Similarly, the concentration of glutamate, the most important excitatory neurochemical in the brain, did not differ with diagnosis in the regions investigated. In one region, involved in cognitive control, attention and emotion regulation, we found obsessive-compulsive symptoms within participants with TS was related to the level of glutamate present. Autism symptom severity across all participants was found to relate to measures of cell density in the same region.

This work does not support CSTC involvement in TS and/or ADHD in children. Differences seen in adults may represent compensatory mechanisms. Results regarding obsessive compulsive behaviours and autism symptom severity require further investigation but are promising for the identification of neural correlates of autism symptoms and obsessive-compulsive traits in children.

Natalie Forde (1987) studied chemistry at the University College Cork and neuropharmacology at the National University of Ireland Galway in Ireland. Her research is part of the research programme Abnormal Neurological Development: Early Diagnosis and Intervention of the Research Institute BCN-BRAIN and was funded by TS-Eurotrain, a European subsidy. Forde will work as postdoctoral researcher at the Centre for Addiction and Mental Health

in Toronto, Canada. She was promoted on December 4, 2017.

Mitochondrial dysfunction in oxidative stress: On the impact of neuronal KCa channels & calcium signaling in neurodegeneration

P H D S T U D E N T

B. Honrath

T H E S I S

Mitochondrial dysfunction in oxidative stress: On the impact of neuronal KCa channels & calcium signaling in neurodegeneration

P R O M O T O R

Prof.dr. M. Schmidt

C O P R O M O T O R S

Dr. A.M. Dolga

Dr. C. Culmsee

F A C U L T Y

Science and Engineering

Neurodegenerative diseases such as Alzheimer's or Parkinson's disease are characterized by an irreversible loss of neurons in different brain areas. So far, treatment options only target symptoms but not the disease pathology.

In her thesis, Birgit Honrath exploited new protective strategies for the treatment of neurodegenerative diseases by investigating small conductance calcium-activated potassium (KCa) channels and associated calcium signaling. KCa channels prevent increases in neuronal excitability, a key factor that contributes to neuronal death.



■ PHOTO BY SKY SU SKYVISION PHOTOGRAPHY

Honrath found that pharmacological activation of KCa channels protected neuronal cells from oxidative cell death associated with mitochondrial dysfunction through regulating mitochondrial respiration and mitochondrial calcium uptake. Mitochondrial function also depends on calcium transfer between the endoplasmic reticulum (ER) and mitochondria. Using two approaches, she showed that this signaling axis has a substantial impact on neuronal survival. On the one hand, blocking this route of calcium prevented oxidative cell death. On the other hand, promoting ER-mitochondrial interactions increased mitochondrial calcium uptake, impaired mitochondrial respiration and accelerated cell death. In conditions of enhanced ER-mitochondrial connectivity, KCa channel

activation still provided protection against oxidative stress induced by the neurotransmitter glutamate but not by the anti-cancer agent auranofin, indicating potential effects of KCa channels beyond neuroprotection. Furthermore, Honrath found that KCa channels are involved in the development of epilepsy, a disorder characterized by neuronal hyperactivity, and we identified a potential new regulatory mechanism of KCa channels by small non-coding microRNAs. Thus, this thesis elaborated KCa channel activation as a strategy to preserve neuronal cell survival in different neuropathological conditions.

Birgit Honrath (1988) was promoted on December 8, 2017.

>> CONTINUATION PROMOTIONS



■ PHOTO BY FLORIAN SENSE

Multiple states of working memory: Reciprocity between internal maintenance and visual attention

P H D S T U D E N T

E. Sasin

T H E S I S

Multiple states of working memory: Reciprocity
between internal maintenance and visual
attention

P R O M O T O R

Prof.dr. M.M. Lorist

C O P R O M O T O R

Dr. M.R. Nieuwenstein

F A C U L T Y

Behavioural and Social Sciences

Working memory (WM) enables temporary maintenance and manipulation of information, and thus allows us to accomplish most of everyday cognitive tasks. Since only a limited amount of information can be processed in WM at a given moment, it is crucial to maintain information that is relevant to our current goals and to forget information that is no longer relevant. Here, we investigated how various task requirements influence WM activation.

We found that deep encoding of a word (i.e. extracting the meaning of a word) leads to WM activation that in turn directs attention towards a picture that corresponds to this word, even when this picture is not relevant for the task at hand. However, WM activation stemming from deep encoding is lost when the analysis of this word is followed by an attention-demanding task (e.g. solving an arithmetic problem). WM activation of a word that has to be remembered

appears to be reinstated after execution of the additional task. In the current work, we also found that people are able to intentionally forget a single object held in WM and such forgetting leads to rapid but incomplete deactivation of the representation of this object. Moreover, we showed that people cannot selectively remember just one of the features of an object held in WM (e.g. the color of the red square held in WM is not forgotten when the task indicates that only shape is relevant).

These findings show that WM activation can change flexibly and rapidly depending on the task requirements.

Edyta Sasin (1983) was promoted on December 21, 2017.

■ **EVELYN KUIPER-DRENTH, BASED
ON PRESS REPORTS FROM THE
UNIVERSITY OF GRONINGEN**

> CHEEKY PROPOSITIONS

"The health of healthy control participants is in the eye of the beholder."

> Nicky Klaasen

"Experience is what you get when you didn't get what you wanted."

> Birgit Honrath

"De hedendaagse wetenschap is gebaat bij meer dagdromen en minder publicatiedruk."

> Marja Broersma

"Aangezien het leven zich nietsontziend in de lengte uitrolt, moet je het proberen zo breed mogelijk te maken". Vallende ouders - A.F.Th. van der Heiden

> Marja Broersma

"Al gaat er niets boven Groningen, multicentrische (internationale) samenwerking is van het allergrootste belang."

> Alain Dekker

"Het hebben van antwoorden is geen voorwaarde voor geluk. Het durven stellen van vragen wel."

> Christiaan Wesselink

"The most likely conclusion to scientific research is that further research is required."

> Natalie Forde

"Answers do not matter so much as questions, said the Good Fairy. A good question is very hard to answer. The better the question the harder the answer. There is no answer at all to a very good question." - Myles na gCopaleen

> Natalie Forde

"The art of being wise is the art of knowing what to overlook." The Principles of Psychology - William James

> Edyta Sasin

> COLOPHON

**This newsletter is published by the
Research School for Behavioural and
Cognitive Neurosciences**

Frequency

4 x a year

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Cover photo

Sander Martens, www.sandermartens.com

Deadline for the next edition: 18 April 2018

