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*"Too good to let go"*



university of  
 groningen



## > STAFF MATTERS

# A year in perspective

Dear all,  
I would like to wish you a happy and healthy 2017! We, the board of BCN, hope it will be a fruitful year in terms of collaborative, interdisciplinary projects in the field of behavioural and cognitive neurosciences.

Last year, we have seen many good examples of what BCN stands for. I will highlight some of them here and I will finish by stating why 'BCN is good for you'!

First of all, in March 2016 we had an inspiring retreat with a large group of our BCN PhD students. Not only did we watch many high level and concise presentations (with feedback from PI's), but we also went 'mountain biking' through the beautiful landscape of Drenthe, participated in a hilarious pub quiz and some of us even scored points on the bowling court (not me, I have to admit).

The enthusiasm of PI's and PhD students was also apparent at BCN's Winter meeting during which for the first time BCN researchers presented their scientific work in the format of 'Ted-like Talks'. Martine Maan, Martijn Wieling, Jon Laman, Deniz Baskent, Fred Keijzer and Hedderik van Rijn all had smooth presentations despite the strict time limit (6 minutes...!) and just a few informative slides. The following discussion turned out to be more interactive than they might have been after a lengthy talk. Our aim is to record these talks and put them on the website, so others can see what BCN researchers do (and researchers may use it for

their own public profile). For the first time in BCN's history, the BCN 'Dissertation award' as well as the BCN 'Summary award' were both won by the same candidate, Amarins Heeringa, former PhD student of the department of Ortholaryngology (UMCG) for her work on 'On Sound and Silence Neurophysiological and behavioural consequences of acoustic trauma'. She presented her work via an online Skype-connection as she was abroad for a research exchange. You may not always realize the significance, but previous winners Linda Geerligs ('Dissertation Award 2013/2014') and Koen Haak ('Dissertation award 2012/2013') both obtained a VENI grant this year. So do not take this lightly...!

In line, the evaluation of the BCN Research Master Behavioural and Cognitive Neurosciences this year by the NVAO (Accreditation Organisation of the Netherlands and Flanders) was, like the previous evaluation, very positive. The visiting committee phrased it as 'excellent', just like the KNAW (Royal Netherlands Academy of Arts and Sciences) did in the earlier visitation. However, the NVAO central board is still contemplating what superlatives to use officially. Of course, we fully understand that it is not easy to find a fitting term for this programme.

In June 2016, the BCN Symposium was organized around the theme 'Sensory Systems: from Molecule to Mind'. Organizers Sonja Pyott and Amalia Dolga composed a very interesting programme around vision, smells, light, sound, and other vibrations, and the relation with

physical and mental disorders. With heavy rains outside, the talks at the Zernike Campus were stimulating and insightful.

September's annual BCN PI Meeting again stood in the light of bringing together PI's within the Research School BCN. The meeting was organized by Sonja Pyott and Wiktor Szymanski and the programme consisted of a lecture on 'Professional Development' by prof. Ritsert Jansen (Dean of Talent Development), four 'Ted-like Talks', and a keynote lecture by Prof. Dr. Rupert Lanzenberger (Medical University of Vienna) on 'Functional and molecular brain imaging in psychiatry, neurology, and clinical neurosciences'. In addition, there was plenty of time for interesting discussions and exchange of ideas. During the extended lunch break, a task for everyone present was to team up with colleagues and come up with a research idea that needed to be 'core BCN', in the sense that it was novel and involved different fields of expertise and disciplines. The winning proposal (we had a small competition) by Marije aan het Rot, Nico Leenders, Miriam Kunz and Martijn Wieling was called "Parkinson's Together!" and aims at improving the quality of life of Parkinson's patients by examining and improving their communication with their partners. There was a prize for the best proposal, but probably more important is that these ideas can be submitted to the research master programme to form the basis for a research elective for BCN Research Master students, and may thus end up as PhD projects after finishing the master.

Overall, we had 44 BCN PhD students who defended their theses this year, including 10 external PhD students, with 34 PhD students having participated in the BCN PhD Training



Programme. This year 60 new BCN PhD students enrolled, which is higher than ever.

In the coming year, we as board aim to further facilitate interaction between neuroscience researchers from different disciplines and faculties, by continuing the above activities and together with students and researchers develop new ideas and projects and seek the financial means to make that possible. Michiel Hooiveld and other members of the BCN Staff office can be contacted and can provide fairly good ideas about funding options. One of our goals is to further develop exchange with our partners within the U4 (a strategic partnership between the Universities of Göttingen, Ghent, Uppsala and Groningen) and other Universities, such as the Justus Liebig University, Giessen, to enable new collaborative scientific and teaching projects. Don't hesitate to contact us!

■ BY ROBERT SCHOEVERS

■ PHOTO BY ANTOINETTE BORCHERT



# Learning language from expectations

## An interview with Jacolien van Rij

Learning a language is something every human being does, but it is still not clear how children exactly acquire such a complex system. Dr. Jacolien van Rij was recently awarded an NWO Veni grant for her project 'Learning language from expectations' in which she uses error-driven learning to find out how children learn to understand sentences. On the basis of a variety of research techniques, she studies the hypothesis that learning a language requires updating one's expectations for each input.

### **Could you explain the title of your VENI-project, "Learning language from expectations"?**

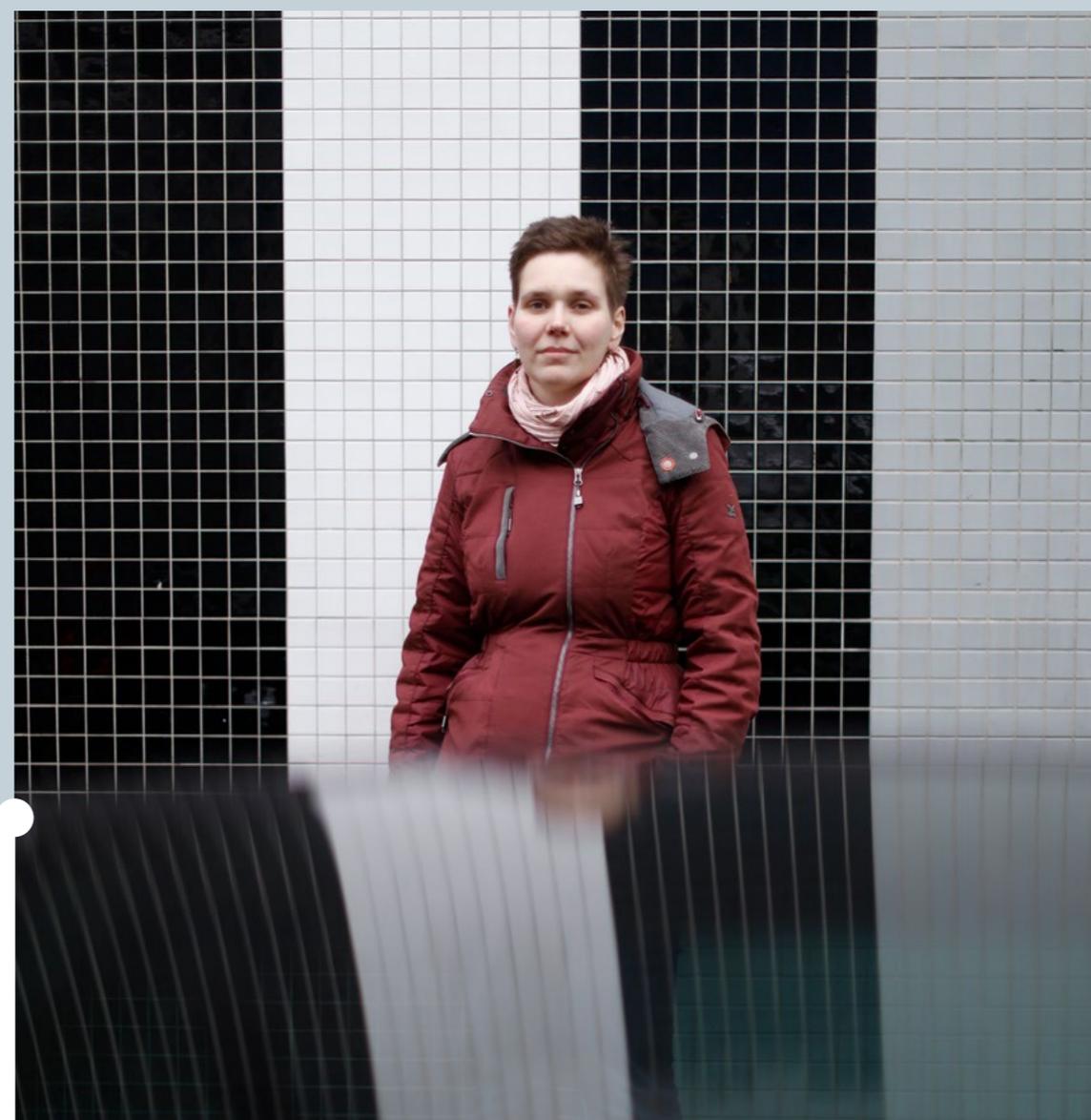
I am interested in how children learn to comprehend sentences. To study this I use a theoretical framework that is called Naive Discrimination Learning (NDL) (Baayen et al., 2011), which basically implements error-driven learning (Rescorla & Wagner, 1972). In this framework, learning events are characterised by predictions. If two things that normally co-occur suddenly stop taking place at the same time, the expectation of these events to co-occur is violated. Let's take Pavlov's dog as an example. Pavlov's dog was trained to expect food whenever a bell rang. However, if all of a sudden the ringing of a bell would not be followed by the presentation of food, the dog's expectation would be violated. As a result, his predictions regarding the connection of the cue (the bell) announcing the presentation of the outcome (the food) needs to be adjusted. In other words, the dog learns that the first event, the bell, apparently is not a completely reliable predictive cue for the second event,

the food. We assume that the same mechanisms play a role in learning a language, hence the title "Learning language from expectations".

### **Why do you specifically focus on children's comprehension of sentences?**

Error-driven learning has already shown its potential both in and outside the field of language development. For example, it has been used as an alternative to the theory of associative learning, which only treats associations between events that co-occur, but which does not account for the 'un-learning' of associations.

*> Originally error-driven learning was proposed to explain animal cognition and behaviour, but it turns out that humans also perform according to this learning paradigm. <*



## &gt;&gt; CONTINUATION OF LEARNING LANGUAGE FROM EXPECTATIONS



> *I actually discovered by accident that I was interested in language.* <

In the last ten years researchers have begun to apply the theory to language. For example, it has been found that the theory is successful in explaining phenomena in linguistic morphology (Baayen et al., 2011) or how children learn categories (Ramscar et al., 2011). Nevertheless, sentence processing is a higher-level language skill, because you need to integrate the meaning of multiple words and in addition take into account contextual factors to formulate a sentence meaning. Therefore, it is interesting to investigate which cues children need in the environment to build fine-grained expectations regarding a certain meaning of an entire sentence, provided error-driven learning also plays a role in sentence acquisition.

### ***How did your background in human machine communication get you to study language?***

The Human-Machine Communication programme was part of the Artificial Intelligence programme and also offered linguistic courses, because language is part of intelligence. Furthermore, the programme gave students ample opportunity to create their personal curriculum on the basis of optional courses. When I applied for a student-assistant job for Petra Hendriks and Jennifer Spenader, I realized that the majority of the optional courses that I followed were linguistic courses. They were searching for a student-assistant who could help them in constructing a computational model for language change over time. So I actually discovered by accident that I was interested in language, and from that moment I continued to study it.

### ***How much of our language abilities do you think are language-specific instead of originating from general intelligence or cognition?***

This question is not easy to answer. On the one hand language takes place in the brain, therefore it follows the 'rules' of the brain. Error-driven learning is also assumed to be a general cognitive mechanism. Originally error-driven learning was proposed to explain animal cognition and behaviour, but it turns out that humans also perform according to this learning paradigm. Moreover, the paradigm successfully applies to language. Language thus seems to follow the general cognitive system. On the other hand, language processing has a special status, which is reflected in the exceptional speed at which language processes can take place. For instance, in processing a sentence you need to carry out several things within a very short amount of time: combine the meaning of several words, construct a meaning representation of the sentence

as a whole, take into account contextual information, the facial expression and gestures of the speaker, and account for the perspective of the speaker. The speed at which people process sentences exceeds the speed of other general processes that start in the brain, such as motor behaviour or calculating a simple mathematical formula. This suggests that language processing takes a unique position in human cognition. The uniqueness of language is also demonstrated by the fact that there are areas in the brain that are specialized for language, such as Broca's area or Wernicke's area. It makes sense that language is a special part of human cognition, because communication is essential in the life of human beings.

### ***In your research you focus on the processing of pronouns, such as 'he' and 'she'. Why?***

Pronouns are interesting. They provide a nice window into how sentence processing works. The word 'he' or 'she' generally does not have a meaning in sentence; it only signals whether you are talking about a single male or female character. Due to the lack of intrinsic meaning of pronouns, you need to attribute meaning to them based on the contextual, grammatical, semantic, and even prosodic information in the sentence. All these sources of information can change the meaning of a pronoun. This makes pronouns difficult to learn. Compare for example the sentences 'James praised Rob, because he admitted the theft' and 'James praised Rob, but he admitted the theft'. Combining many types of information is part of processing a sentence, although you can sometimes figure out the meaning of a sentence by simply following its grammar or the meaning of some words. Particularly in pronoun processing, many factors are at play. Given this complexity, I am interested in how children learn to do this while they are never explicitly taught how

## >> CONTINUATION OF LEARNING LANGUAGE FROM EXPECTATIONS

pronoun processing works. Besides the fact that the meaning of pronouns is constructed in a complex way, what is also interesting is that pronouns are generally processed very fast. In most non-ambiguous situations, you immediately know about whom a speaker is talking when he says 'he' or 'she'. The variable meaning of pronouns even seems to make processing more efficient. All of this makes pronouns a fascinating linguistic phenomenon to study.

### ***In your work, you use various research methods. How do you combine the information gained from these different research techniques?***

We start by capturing our theoretical hypothesis into computational models and run simulations to see which predictions about language are predicted by the model. These predictions can subsequently be used to test a theory experimentally. Corpora, such as the corpus of spoken child language CHILDES are helpful for the simulations, because they provide data that we can use as naturalistic input to the computational model. Alternatively, we can compare the naturalistic data from a corpus with the utterances that would be generated by the model based on the theory. Eventually you want to test your hypotheses on people and for this we for example ask children or adults to listen to a sentence and tell us whether they think it is correct or not. However, it is more interesting to study how children or adults comprehend language while they process the language in question. This can be done by online research methods such as eye-tracking or EEG. By measuring people's electric brain activation patterns or eye movements, these methods enable us to see for instance which part of a sentence is difficult to process for people or which information people use to understand the sentence. In many cases

the real language processing turns out to be much more complex than the way you modelled it in a computational algorithm. In this way, the experimental findings provide new ideas for the computational models and the information circle starts again.

### ***Could your results about children's language processing in the end be used in practice, for example, in language teaching?***

Yes, I think that the learning theory I use in my project makes the data appropriate to be applied to practice. Many studies in language acquisition research focus on the questions what children can and cannot do, and when children acquire certain phenomena. However, the approach of my VENI project is different in that it focuses on which types of information children use to process and understand language. If we know which sources of information children use to learn language, we can change the input they receive when it turns out that the information they use is incorrect or insufficient for successful language acquisition. In other words, if we know what children need to learn language phenomena, we can integrate this knowledge in teaching methods to improve children's performance. Even though in clinical groups of children, for example children with ASD, confounding cognitive problems such as attention deficits or working memory limitations may play a role, we still assume that their learning mechanisms are the same. Therefore, a learning theory is useful to study typically developing children, as well as children that show difficulty with acquiring language.

■ BY AMÉLIE LA ROI  
■ PHOTOS BY SANDER MARTENS

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> *Pronoun processing provides a nice window into how sentence processing works.* <



# Bilingualism is all around

## An interview with Rosalind Franklin fellow Merel Keijzer

**How does speaking multiple languages influence human cognition? What happens to your native language skills if you only use your second language? Does bilingualism 'slow down' the effects of cognitive aging in older adults? These are some of the questions Rosalind Franklin Fellow Dr. Merel Keijzer studies in her multifaceted research on bilingualism. As an Associate Professor in Applied Linguistics, she investigates 'bilingualism in its broadest sense'.**

### *As you put it, you investigate bilingualism in its broadest sense. What does this mean?*

Studying bilingualism in its broadest sense means that I not only look at the linguistic aspects of bilingualism, but that I also take into account external (social) and more general cognitive factors that play a role in the life of bilingual speakers. For my dissertation research I started by investigating language attrition. Language attrition can be seen as a kind of unbalanced form of bilingualism in which the speaker loses proficiency in one language over the other. This linguistic proficiency balance continuously changes over the lifespan, for example as a consequence of moving to another language environment or through the effects of cognitive aging. Moreover, as you cannot foresee which external factors will influence a bilingual speaker's proficiency in either language in the future, this language balance is unpredictable. The fact that so many factors can influence the linguistic abilities of a bilingual speaker made me realise that bilingualism is not only a question of the acquisition or attrition of one or two languages, but that bilingualism should be considered in a broader perspective by also taking into account external social factors and general cognitive factors.

### *How do you make sure your research always reconnects to the topic of bilingualism?*

The common thread in my work is always how the inhibition and/or activation of two languages in bilingualism affects people's cognition throughout the lifespan. To give an example, I investigate the cognitive consequences of being bilingual and since these are most pronounced at the ends of the lifespan, I study these effects in older adults. For example, studies show that the negative effects of cognitive aging are less severe for bilinguals. However, the findings about the existence of this 'cognitive reserve' are mixed. I try to figure out which factors cause the differences in the results. In doing so you cannot bypass external factors, because bilingualism is in everything you do. Even playing chess is done in a language and there is also such a thing as internal language when you do not speak. As a researcher in applied linguistics, you thus have to study bilingualism in a broad perspective, because you need to see the bigger picture.



> *When studying bilingualism you need to see the bigger picture.* <

## &gt;&gt; CONTINUATION OF BILINGUALISM IS ALL AROUND



> *Speaking multiple languages is such an intense experience that the premise of cognitive advantages through bilingualism is too good to let go.* <

***Is it still possible to compare monolinguals to bilinguals in a society in which almost everybody speaks at least two languages?***

Although it is indeed very difficult to find real monolingual speakers nowadays or at least it is in the Netherlands, this does not mean that you cannot investigate bilingualism anymore. It is actually even more interesting to study bilingualism as a continuum instead of as a binary factor. The majority of people speak multiple languages nowadays, but not everybody uses both languages to the same extent. Therefore, you can compare “high intensity” bilinguals to “low intensity” bilinguals. This strategy to studying a phenomenon is similar to how doctors study risk factors for a disease. Whether someone knows how to swim does not influence that person’s risk of developing cardiovascular diseases, but the important question is how often he or she actually swims. A parallel can be drawn to language. Whether you are able to speak

two languages is not crucial, but whether and how you actually use those two languages can have a differential effect on your cognitive abilities. In other words, it is interesting to study *language patterns*. In this way a lack of purely monolingual speakers is not a problem as long as you consider bilingualism as a continuum and try to find out in which factors different bilingual speakers differ and how this affects their cognitive capacities. Being a researcher in the north of the Netherlands is in this case very interesting, because there are ample populations to study, such as Frisian elderly, but also elderly adults who speak the dialect of Groningen besides the standard Dutch language.

***What is the status quo of the debate about the (non-)existence of the cognitive reserve through bilingualism?***

After Bialystok had found the first indications of a cognitive advantage of bilingualism (Bialystok, Craik, Klein, & Viswanathan, 2004), people started to investigate the cognitive reserve as a kind of treasure hunt. Experimental studies lacked a solid theoretical framework that could help researchers think about which factors would actually contribute to the expected cognitive advantage of bilingualism. As a consequence, some studies found an effect, while others did not and nobody knew why. A recent development is that researchers tend to dissociate from comparing groups of monolinguals to groups of bilinguals, because groups of people differ on many more dimensions than on merely the fact whether they speak one or two languages. The focus has shifted towards individual differences, especially with regards to patterns of language use in individual speakers. Furthermore, the cognitive reserve is more often investigated in large studies in which different labs cooperate with each other to get highly specified data sets. I think all of this is a very positive development, because I most certainly

think that some kind of cognitive effect of bilingualism exists. Speaking multiple languages is such an intense experience that the premise of cognitive advantages through bilingualism is too good to let go.

***Do you yourself cooperate with other labs in your research, in and outside of the RuG?***

Yes, within the Young Academy of Groningen, for example, I am trying to put together a project with Marie-José van Tol who heads the Neurocognition of Mood Disorders group of the NeuroImaging Center. By using fMRI-scans, she discovered that depressive patients’ brain activation patterns in areas involved in inhibition significantly change after receiving cognitive therapy. We are now trying to investigate whether learning a second language can serve as a form of cognitive therapy. The underlying idea is that speaking multiple languages also trains cognitive control skills by continuously switching between the different languages.

We are currently also actively trying to set up collaborations with several UMCG partners, such as the Lifelines database. The Lifelines database is an excellent resource for the study of cognitive aging and bilingualism, because it includes a large population of people aged 65 and older and moreover, many of them speak a dialect or the Frisian language in addition to standard Dutch. The data from our language use questionnaires could later on be correlated to already existing measures in the Lifelines database, such as cognitive measures, measures of risk for Alzheimer’s disease, but also measures about well-being. Are people who speak several languages less affected by, for example, age-related depression? We are also in the process of setting up a more structured collaboration with the geriatrics department of the UMCG. They do so much interesting work on SeniorLines, also looking

## &gt;&gt; CONTINUATION OF BILINGUALISM IS ALL AROUND

at which lifetime factors stimulate healthy aging, and if language use can also be brought into that picture, that would be great.

Besides my collaborations within the RuG I still work together with several researchers from the Center for Language Science at the Pennsylvania State University in the U.S. where I worked for one year before coming to Groningen. Furthermore, for an ERC proposal that I submitted recently, we collaborated with Thomas Bak, who has done very interesting work on the interplay between bilingualism and Alzheimer's disease as well as between bilingualism and stroke recovery. Together with Thomas, we investigate topics other than the cognitive advantage of bilingualism, such as the question whether bilinguals recover faster after suffering from a stroke. The aging issue can best be tackled from an interdisciplinary perspective and so working together with all these fantastic groups and researchers enriches my work on bilingualism.



> *Get rid of the impostor syndrome.* <

***In 2013 you became a Rosalind Franklin fellow. What does this fellowship mean?***

The Rosalind Franklin fellowship (RFF) is meant for female researchers who are in the beginning or middle of their academic careers and who have the ambition to become a full professor. The goal of the RFF is - amongst other things - to change the skewed distribution of male and female professors in the Netherlands. In fact, the fellowship is the same as a tenure track, but in this case especially targeted towards women. Nevertheless, the fellowship not only provides a tenure track, but also a network of other RFFs between the different faculties. Furthermore, every year a dinner is hosted for all the fellows and the money that is raised during the dinner is used to enable a female MA student to write a proposal for a PhD project. So the RFF is broader than only early or mid-career female researchers. All in all, I think the RFF is a great initiative and that it carries a strong name. Rosalind Franklin was one of the best researchers of her time and died by the radiation of the X-rays that she performed for her studies. Her story of contributing to the discovery of DNA through X-ray studies while not receiving full credit for this is an iconic one. Rosalind Franklin - through the Groningen fellowship programme - in a way now lives on in a new generation of female researchers.

***What would be your advice to young female researchers?***

The following points of advice actually hold for all researchers, but maybe especially for women.

***Get rid of the impostor syndrome***

Suffering from the impostor syndrome means that you tend to ascribe your success to sheer luck and therefore efface yourself and your qualities. There are actually whole theories about this. Women tend to be

afraid that someday someone will discover that they are not that qualified as everybody thought they were. Recognizing this tendency to efface yourself is already a big step to overcoming it.

***Do not let anybody drive you out of your mind***

For example regarding the amount of hours that you think need to be put into your work in order to be successful. Try to work efficiently instead of working every minute or every day. It is not easy to get rid of this tendency, because it is part of the academic culture. This is also something that we focus on in the Young Academy and I hereby invite all early career researchers to attend lunch meetings that we as the Young Academy have planned for the new calendar year to discuss the work-life balance in academia. Details of the meetings will be posted on the university website.

***Make choices***

Making a choice closes one door, but also opens many others and enables you to focus and become a specialist. The tendency to always keep several options open partly originates from insecurity, but making choices really is essential. Thinking about which choices to make is easier to do from a meta-level, so talk about this to other researchers at meetings.

■ BY AMÉLIE LA ROI

■ PHOTOS BY RONALD ZIJLSTRA

# The Path to Professorship

## An interview with Nomdo Jansonius

Dr. Nomdo Jansonius is a professor, researcher, physician, supervisor of over 15 PhD students, and head of the Ophthalmology Department at the UMCG. To those around him, it often seems there cannot possibly be enough hours in a day to accomplish all that he does. Becoming a professor and physician was not his goal from the beginning but simply the result of a dedicated pursuit of his interests. In that mentality is the secret to his success: Work does not feel like a chore or punishment if you are doing what you like.

### ***Where are you from originally?***

"Born, raised, and went to school in Groningen. My dad came from Winschoten – a used-to-be lively town in the province of Groningen close to the German border; my mum came from Voorburg, a village in the west."

### ***You did your master's in physics here in Groningen. Did you know then that you wanted to become an ophthalmologist? If not, what made you decide to take that path?***

"In high school I liked physics most. As I liked technical stuff as well (from playing with Lego to building radios and repairing bikes), I thought that applied physics should be fine for me. I visited the 'open days' of all three technical universities in the Netherlands (Delft, Eindhoven, and Twente) but at age 16 did not feel at home there. With only one place left where applied physics could be studied, Groningen, I just registered without visiting another open day. I liked studying physics but it felt somewhat too narrow – the next year I moved to medicine. Not to become a physician, but because of the broad scope: chemistry, physiology, anatomy, cell biology etc. Completely different from the current curriculum! Albeit quite interesting, my

brain became rusty and I moved back to physics. Another switch, back to medicine, and after that I decided to postpone any irreversible decision and to finish both. After completing my master's in physics, I got the opportunity to do my PhD in physics as well, in the department of biophysics. A great period – even more appreciated in retrospect... I finished my PhD during the internships, and it was not until my internship in ophthalmology that I decided to continue my career as a physician. So, a well organized internship makes a difference!"

### ***Your education and career have taken place primarily in Groningen. What is it about this city that made you want to continue here?***

"My parallel studies were partially out of phase, making it difficult to move at apparently logical time points as, for example, between my master's and PhD. Also, I got opportunities and failed to find any urgent reason to leave. As a result, I only left Groningen for my secondment during the PhD, in Cambridge, and as part of my internships, in Zwolle."

*> It's the mix that I like. Being a physician gives me the opportunity – and the duty – to improve patients' lives; patients' needs and questions inspire my research. <*

### ***What do you find most challenging about being both a professor and a physician at the same time? Do you prefer one to the other?***

"It's the mix that I like. Being a physician gives me the opportunity – and the duty – to improve patients' lives; patients' needs and questions inspire my research. I like doing research to understand visual processing in the eye and the techniques that can be used to assess the eye. The results improve the care in our own department and elsewhere – closing the circle."



## &gt;&gt; CONTINUATION OF THE PATH TO PROFESSORSHIP



Difficulty in choosing what to study? Doubt is a good start to a career in science.

**You are the programme coordinator for two recently funded projects about glaucoma: EGRET and EGRET+. These projects include 25 PhD students, many of whom you are supervising here in Groningen. Can you share a bit about what you expect to gain from this experience personally and how science in general will benefit?**

"It's a great privilege and opportunity to be able to bring together so many well-educated, enthusiastic young people from different disciplines and from literally all over the world – all focusing on one eye disease, glaucoma. Together with Frans Cornelissen, we approach glaucoma from two different sides, the

eye and the brain. The projects give us the opportunity to start or renew fruitful and enjoyable collaborations within the UMCG (with audiology, genetic-epidemiology, and neurology) and in various European countries. There are quite a few big issues to be solved in glaucoma and the projects enable us to surpass a critical mass to solve at least some of them."

**How do you balance the intense workload at the hospital with maintaining a personal life? What is your ideal way to spend your time outside the hospital?**

"As an ophthalmologist, you live in the dark. I like to be outdoors. If the wind is east I like to go to the 'Waddenzee', which can be crossed on foot if the tide is low. If the wind is west, lake Paterswolde is the place to be, where we have a small 'dacha' and sailing boat. If there is no wind, cycling in the province or working in our small orchard is what I like to do. When it rains, I play cello or build furniture or electronic devices (some of the equipment we use for science has been soldered by my eldest son and me). The weather is important in the Netherlands! Programming is also a hobby that makes work and free time sometimes indistinguishable."

**What advice would you give to any current master and PhD students who are considering a career in academia?**

"If you want to make a difference, you have to work hard. If you like what you are doing, that's no punishment but fun. Enjoy your PhD – as a period of freedom for learning new things and doing science, and as an opportunity to make well-considered decisions for your future."

■ BY ALLIE LOISELLE

■ PHOTO BY RONALD BIERINGS

## Intro new staff writer



> ALLIE LOISELLE

After an internship with the U.S Navy at the end of my undergraduate degree in kinesiology, I realized that I was fascinated with the ways in which the human body withstands and can adapt to extreme conditions. Shortly after graduating I began working as a contractor for the Navy investigating altitude physiology, circadian disruptions in special ops personnel, and dive physiology. I then went on to my master's in space physiology at King's College in London to delve into one of the most extreme environments humans have ever faced.

I'm now a PhD student at the UMCG investigating how intracranial pressure affects Glaucoma and how to measure it non-invasively. This research has a direct connection to a condition that happens to astronauts called visual impairment intracranial pressure (VIIP). I hope to connect the two and to help find countermeasures for both astronauts and glaucoma patients.

■ PHOTO BY SANDER MARTENS

# Healthy feedback

## An interview with Stéfanie Enriquez-Geppert



***You are a newly appointed assistant professor in the Department of Clinical and Developmental Neuropsychology. What were your first impressions of conducting research in Groningen?***

Earlier in 2016, I was invited by André Aleman (Neuroimaging Centre, NIC) to give a talk about a neuroscientific training approach for the improvement of specific cognitive functions. At that time, I already noticed that executive functions are a vivid scientific topic not only at the NIC but also at the Department of Clinical Neuropsychology, which makes it very easy for me to discuss my own research with fellow scientists. Exchanging information on such levels really makes it an exciting and valuable experience. I also have noticed that most of the researchers strive to relate basic and applied research to daily life activities, such as the relationship between cognitive dysfunctions and driving ability. This scientific translation is an interesting approach as it addresses the question of whether and how our research can affect and improve day-to-day life.

Another characteristic I have positively been impressed by is the explicit promotion of collaborations between different departments. Within the university, symposiums are organized regularly to offer scientists a platform for exchanging their views and discuss certain topics. I think it's quite special to be able to connect and work so easily with other groups and departments, and this benefits research enormously. I feel very welcomed and am quite happy to be here.

***I noticed that you have worked in many different labs and have visited several countries where you worked on your research. Do you believe that going abroad and working in different labs is something every researcher must do?***

Yes, I believe that working in different research labs forms an important aspect in a scientist's career. Each lab has its own way of how research is organized and performed. Given that each lab has its own field of expertise, research approaches and techniques as well as preferences for hard- and software products, working

in different labs promotes the development of new and fresh ideas. The collection of such experiences can give insight in intercultural competences as well as the advantages and disadvantages of various techniques. In this way, one gets used to take different perspectives and learn how to add or apply newly acquired skills to one's own studies. To give you a concrete example: during my PhD research stay in Norway, I got to know a new and advanced data analysis method that we applied to MRI data I collected in the past. Later, we used this knowledge to adapt the method also for EEG data.

Apart from the personal and professional development, changing labs enables the use of resources that are unavailable in one's own country. My research stay in Cambridge allowed us to study not only a very specific but also a large pool of subjects, namely a group of specific lesion patients in a very short time. Of course, it is uncomfortable in the beginning to leave one's familiar surroundings and stable social

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## &gt;&gt; CONTINUATION OF HEALTHY FEEDBACK



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network. However, I really believe that for going abroad the benefits outweigh the negative. It's a nice way to connect to other scientists and broaden one's network, and I especially recommend it to young scientists.

***Now that you are here in Groningen, what will you be working on?***

The neural correlates of executive functions and their impairments form my main research interests. One of my work foci will be the testing of novel neurofeedback techniques to reduce cognitive impairments in patients. Back as a post-doctoral fellow in Oldenburg, I investigated whether executive functions are plastic and could be trained for improvement. The use of neuroscientific approaches allowed us to develop new tools for the training of executive functions based on what we already know about the brain. It has been shown that there exists a relationship between executive dysfunctions and the prevalence of several clinical disorders such as ADHD, schizophrenia,

Parkinson's disease, and Mild Cognitive Impairment (MCI), disorders that are extensively investigated here in the Department of Clinical Neuropsychology and the NIC. It is exciting to observe that neurofeedback could serve as a technique to train executive functions. We noticed that there is a lot of expertise that could be combined, which led us to make the decision to collaborate. Shortly after, positions became available at the RuG. It really was a lucky coincidence!

***Could you tell us more about neurofeedback and how you use this method in your studies?***

In a nutshell, neurofeedback is a method in which subjects learn to regulate their own brain activity measured with MRI, NIRS and EEG. The combination of learning mechanisms and the accessibility of brain activity enables subjects to gain control over their own brain activity thereby improving behavioural outcomes.

In the case of EEG neurofeedback, one could utilize brain oscillations that are associated with cognitive processing. Some oscillations are suggested to serve as a medium through which the brain communicates. This was shown on a single-cell level in experiments by Womelsdorf with macaque monkeys carrying out executive functions tasks. Especially with executive functioning, a clear brain rhythm can be discerned: theta waves. Frontal-midline(fm) theta – an oscillation usually measured at frontal midline electrode positions with EEG – serves as the “working language” of the brain by integrating information originating from computations of different brain regions. Whenever executive functions are needed or successfully implemented, fm-theta increases in amplitude or power. This relationship is so prevalent that power values of the oscillations can be used to predict behavioural outcomes, as some fellow scientists have shown. This is of course an interesting

scientific observation because the question of what effects on behaviour would the manipulation of these power values have arisen. Trying to tackle this issue, we established a protocol of a neurofeedback training. Subjects visited our lab for several days and learned how to voluntarily increase their theta activity. Executive functions were assessed before and afterwards by means of a neuropsychological test battery. Comparisons between a group that received true feedback and a group that received a mock training showed indeed a change: after 8 sessions, subjects were able to increase their fm-theta power and this effect was transferred to task performances on executive functioning. In the past, findings were inconclusive about whether every type of oscillation could be manipulated using neurofeedback. So for us it was very exciting that we were able to show that fm-theta can be trained and even had an effect on cognition.

***Now that executive functions are shown to be plastic and can be improved, how can this be helpful to people who struggle with daily life situations?***

The improvement of executive functions by neurofeedback is still at an early stage. Facing the worldwide demographic changes regarding ageing and the burden of disorders associated with executive impairments, a next step will be to apply the neurofeedback training to patient groups and the ageing population who are negatively affected by the consequences of their cognitive impairments. From the literature, we know that there is a positive correlation between age and a decrease in executive functioning, which in turn is associated with the decreased ability of older people to live on their own. This increase in cognitive impairments poses a challenge that many patients, caregivers and the society in general must

## &gt;&gt; CONTINUATION OF HEALTHY FEEDBACK



> Some oscillations are suggested to serve as a medium through which the brain communicates. <

face. The application of hypothesis-driven research to daily life activities is central to such a possible study and the science community will eventually have to figure out how such interventions can be implemented in real life in order to be maximally helpful and effective for the affected population.

***You are improving subjects' executive functions by training them to regulate their fm-theta brain activity. I wonder, however, whether executive functions solely rely on fm-theta waves?***

Indeed, theta waves are crucial for executive functioning but they are not the only type of oscillations important for these cognitive processes nor are power increases the only mechanisms associated to successful performance. It is known that some oscillations are the driving force behind other oscillations, suggesting that executive functioning might not solely rely on theta waves but on the combination of different oscillations and

their computations across different brain areas of a network. Power increases of fm-theta form one mechanism that we investigate in our studies. In regard to neurofeedback research, one of the next steps is the training of connectivity. We assume that theta oscillations are generated in the midcingulate cortex serving as a central driver in the network to implement executive functions. Previous experiments have shown that the midcingulate cortex is working together with the lateral prefrontal cortex. Having this in mind, future neurofeedback protocols can be developed that eventually will lead to a better and more specific training of executive functions.

***As you explained in the beginning, neurofeedback can be used as a therapeutic tool for disorders such as ADHD. I can imagine that for ADHD patients who have trouble sustaining attention, it can be quite difficult to follow the training, which in turn might affect the outcome. Does this pose a problem to your research?***

You are right to assume this. Conducting neurofeedback is similar to all other EEG experiments. Participants should try to sit still, avoid movement and excessive eye blinking. And this can pose a real challenge for specific patient groups with motor agitation such as schizophrenic patients. In contrast to standard EEG experiments, however, neurofeedback underlies online analyses meaning that the data can't be processed afterwards to get rid of artifacts. Every time a participant is moving or blinking, trials have to be excluded and learning time is lost. It's something you have to expect when working with patients and stresses the importance of adapting the protocol to patient groups for instance by including online correction methods. This is not the standard for most software products, however, and much more work is needed to improve such methods. It would be very unfavorable

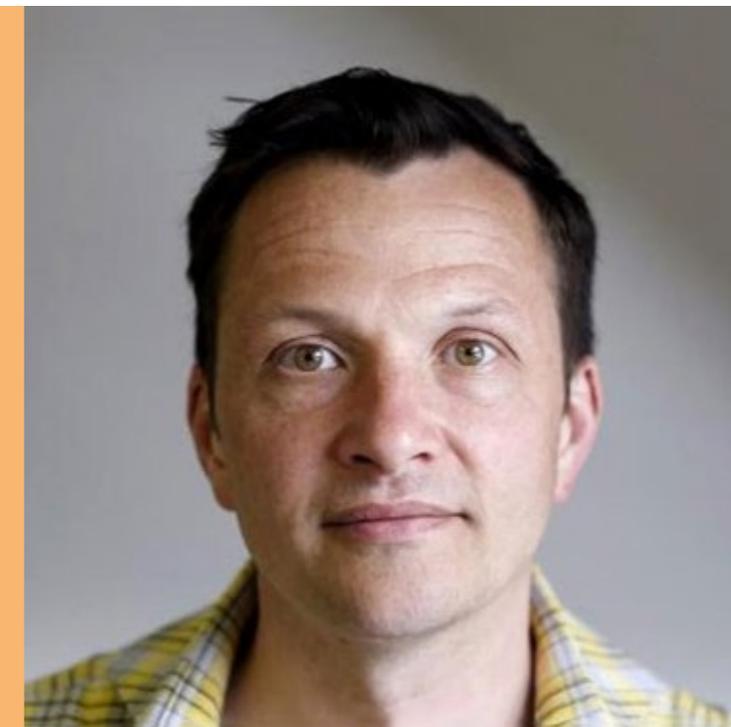
to ignore the effect of movements on the EEG. In that case, there is the risk that subjects wouldn't learn to self-regulate the brain activity but instead would learn the association between muscle tension and the enforcement signal. The neurofeedback sessions would turn out useless. On top of that, neurofeedback often has received justified scientific criticism when used without a control as a therapeutic tool. As a result, it's difficult to figure out if the reduced ADHD symptoms for example indeed derive from the neurofeedback training or just stem from the fact that the ADHD participant learned to sit still during sessions. Thus, one has to be aware of such pitfalls and use scientific criticism, which is very helpful, constructive and required to scientifically move forward. The increase in knowledge about brain mechanisms along with a continuous technical development makes me really curious about how neurofeedback will develop in the next 7 years!

■ TEXT AND PHOTOS BY ANNA LEONTE

# Science About Science

## An interview with Marcus Munafò

Marcus Munafò is Professor of Biological Psychology at the University of Bristol. His main research is on the neurobiological and genetic basis for tobacco and alcohol use, but he has also had a long-standing interest in the role of incentive structures in science, and their impact on research reproducibility. His scientific work on science (metascience) includes reviews and studies on statistical power, analytical flexibility, and reporting biases in various domains such as psychology, neuroscience, and genetics. On the 21st of November, Marcus came to Groningen for the UMCG mini-symposium “Is science having an integrity crisis?” to discuss research reproducibility issues and potential solutions.



### Getting our house in order

#### ***Let's start with the million dollar question: do you think science is having an integrity crisis?***

I don't think integrity is necessarily the right word. The vast majority of scientists are trying to do good work with the tools available to them and using the training they have had. I believe most problems don't arise out of integrity issues, but because well-intentioned scientists may not appreciate how certain ways of working that are commonplace can have problematic consequences.

#### ***Perhaps a better term would be reproducibility crisis?***

I'm also not sure crisis is the right word. I believe it's better described as an opportunity to bring up to date

the way in which we do science and move towards a more diverse system of rewarding outputs that could include publications, but could also include other products of our work such as datasets. People who are interested in metascience are looking at the way science functions and asking: Can we do better? The answer may be that actually what we're doing at the moment is optimal. I don't personally think that's going to be the conclusion, but it might be: it's an empirical question.

#### ***There is a lot of media coverage on integrity and replicability issues. Do you worry this might harm the public's appreciation of science?***

Naturally, there is a concern that these issues will be overstated by the media and there will be unfair critiques of science that, for example, focus on integrity

issues. But ultimately, if the public loses trust in science because the research we generate isn't robust, then that's the fault of ourselves as scientists. The media might be shining a light on it, but actually all that means is that we need to get our house in order and do good work. Therefore, I think the media coverage is helpful in a sense, as it makes scientists sit up and pay attention.

#### ***What are currently the most promising initiatives to improve research reproducibility?***

There are many individual initiatives, which I think are best captured by the overarching initiative of open science: open data, open materials, and preregistration are measures to make the whole scientific process more transparent and therefore more accountable. Open science fits with the ethos of scientists being

*> Open science fits with the ethos of scientists being public servants. <*

## &gt;&gt; CONTINUATION OF SCIENCE ABOUT SCIENCE



> *The focus on how we do science needs to be an ongoing process rather than just a one off process.* <

public servants, who are funded through public funds or charitable donations. Moreover, open science challenges the implicit assumption many scientists have that, due to their intellectual efforts, data are somehow their own. In reality, data are owned by funders and employers. I think making scientists somehow independent of their data is ultimately healthy: if you don't feel as invested in your data, then you won't feel so personally criticized if someone has a problem with your interpretation of the results or if your results prove not to be robust if someone tries to replicate them.

### ***Not everyone is as keen on the idea of releasing data they generated though.***

Of course there are different perspectives and there can be exceptions. For instance, large ongoing cohort studies such as TRAILS here in Groningen or ALSPAC back in Bristol are simply too big to put online in one go. Also, you have to be careful with data protection and confidentiality. In general, however, I think open data is a good principle and an efficient use of resources.

#### ***Tip from Marcus***

Read "Sifting the evidence – what's wrong with significance tests?" A great educational piece on the problems with significance testing.

### ***Some scientists even worry about open data being put to malicious use...***

We need to continually monitor what impact (changes in) current structures have on the behaviour of scientists, because there could be unintended consequences of everything we do. The focus on how we do science needs to be an ongoing process rather than just a one off process.

### **The significance of P**

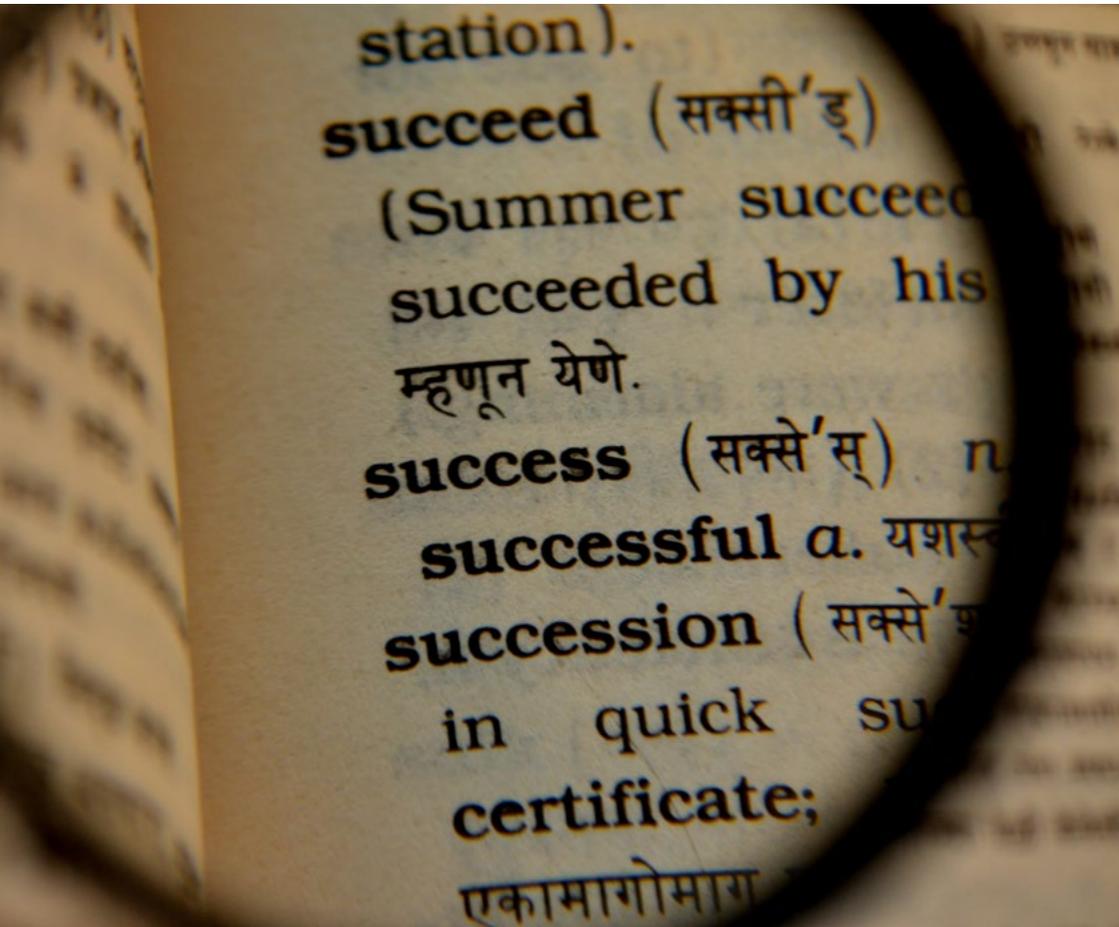
#### ***What change would you like to see most?***

It might seem like a small thing, but one of the first things we did in my lab was stop using the word "significant". There are some journals that have gone further, banning p-values, but I think that's too far; there's nothing wrong with the p-value per se. However, I think the way it is used is often unhelpful: we tend to treat the p-value as a dichotomous – "less than or greater than .05" – rather than a continuously distributed measure of the strength of evidence against the null hypothesis.

#### ***So how would that work in practice? Take, for instance, a typical sentence from a clinical trial paper: group A performs significantly better under treatment X than group B.***

That's a good example of exactly the problem. First, you have the actual data; group A and group B will never be exactly the same in terms of what you've measured. Second, you have the statistic, which tells you something about whether that difference is likely to be consistent with the null hypothesis or not. By saying group A performs significantly better you're conflating those two pieces of information. A better way of describing it might be to say something like: in line with our hypothesis, group A scored higher than group B, but there was no statistical evidence that this difference was meaningful. This forces you to incorporate your prior hypothesis into your interpretation. Moreover, it makes your inferences transparent and allows the reader to judge whether or not those are valid inferences rather than just relying entirely on the p-value.

&gt;&gt; CONTINUATION OF SCIENCE ABOUT SCIENCE



> *This is the reality of the situation: most people are trying to do good work, but the system is not functioning optimally.* <

#### ***How do reviewers respond to this?***

Really positive for the most part. Sometimes you get people saying that because the p-value is .06 you can't say anything at all about your data, but obviously there's no meaningful difference between a p-value of .04 and .06. A larger p-value where your data are in the predicted direction is stronger evidence than a p-value of .05 when your data are in the opposite direction.

#### **Comfort food for thought**

***You have written some papers that were quite earthshattering to me, for instance, a paper on power failure in most neuroimaging studies. How do you keep yourself from becoming pessimistic?***

I'm neither an optimist nor a pessimist. I guess I'm kind of a pragmatist. This is the reality of the situation: most people are trying to do good work, but the system is not functioning optimally. Therefore, we need to try and change it, and that will be a gradual process. At least funders and journals are now starting to take these things seriously. Plus, individual researchers are talking about it, which is great. But if you think about something relatively simple as making publications open access – that project took over 20 years in the United Kingdom! A few years ago, I became much more angry at what I perceived to be inefficiencies, whereas now I'm more pragmatic about how long any changes will take to implement.

#### ***Do you have any advice for researchers going through a crisis of confidence in science?***

One piece of advice is to have confidence in yourself. In my experience, many problems lie not with individual researchers, but with the mismatch between the published literature and the day-to-day reality of doing science. Another piece of practical advice is that when you're choosing a lab to go and work in, don't just go for the most prestigious lab; find a supportive mentor, someone who's going to help you work in the right way. This may be in the prestigious lab, but it may not be.

***A much heard advice for young researchers is that they need to plan ahead and develop their own niche as quickly as possible.***

I think this is one of the subtle ways in which we create incentive structures that are well-intended, but can have unintended consequences. If you become very narrowly focused and you build your whole career on a certain theory or model, and it turns out you were mistaken, it may become very difficult to pull back from that position. But if you have multiple options available to you, it becomes easier for you to disengage and become critical of it. You can see that approach in my research: it's a complete mixed bag of things that were interesting at the time. I gave up on some lines of work, for instance, because the tasks I was using were not robust enough. Earlier in my career I felt like there was no coherence to my research, but now things have come together in a larger programme of work that is coherent. I think moving around different disciplines can bring young researchers a lot.

*Missed the symposium? Marcus' lecture "Scientific Ecosystems and Research Reproducibility" can be viewed online here: <https://www.youtube.com/watch?v=VgrXXInBHMg>*

■ BY JOJANNEKE BASTIAANSEN  
 ■ PHOTO BY MARCUS MUNAFÒ  
 ■ ILLUSTRATIVE IMAGES BY DARIUSZ SANKOWSKI AND PDPICS FROM PIXABAY.COM

## &gt; A DOC'S LIFE

# Met a metascientist who made me think twice

Open up the science section of a newspaper and you will come across an article on the alleged reproducibility crisis in science<sup>1,2</sup>. According to a recent survey<sup>3</sup>, the vast majority of researchers have tried and failed to reproduce another scientist's experiments. Had I known that a couple of years ago, I might not have gone through my own reproducibility crisis. I had a relatively large dataset, but was not able to replicate a seemingly well-established finding. After finally realizing this non-significant result was neither a personal failure nor a mistake, I had to move heaven and earth to get it published. There were times when I just wanted to shove the article back into my file drawer, but I couldn't: I did the work and believed in its veracity.

## You get what you reward

Trying to publish a negative replication study seems to be one of the most irrational strategies a researcher can follow under current incentive structures in science. Research by Marcus Munafò and Andy Higginson suggests that it is much more rewarding for a modern-day researcher to conduct a series of exploratory, underpowered studies in the search for novelty<sup>4</sup>. This will lead to a better publication record, and hence, career success. But what might serve the individual scientist doesn't serve science as a whole. The scientific record will maintain

many false findings if scientists are much more rewarded for publishing novel findings than for (non)replications.

Another way incentive structures can have an impact on scientific discoveries is nicely illustrated by Bill Bryson in *A short history of nearly everything*. The book describes the impressive finds of bones from early humans by palaeontologists at the turn of the twentieth century. Then, in a short but telling digression, Bryson describes how these discoveries could have been even more impressive if not for a "tactical error". One of the explorers, Ralph von



## >> CONTINUATION OF MET A METASCIENTIST WHO MADE ME THINK TWICE

Koenigswald, had “offered locals ten cents for every piece of hominid bone they could come up with, then discovered to his horror that they had been enthusiastically smashing large pieces into small ones to maximize their income.”

I can imagine how future historians will also shake their heads in disbelief when they study our present ‘publish or perish’ culture. Already now, the tactical error seems pretty clear: the overemphasis on the size of an individual’s publication record stimulates practices that undermine the scientific value of research. Consider, for instance, the practice of salami slicing<sup>5</sup>: why publish one comprehensive article when you can also split your study results up and publish them in multiple smaller articles?

### Thinking about science

Fortunately, more and more researchers are thinking about how the behaviour of individual scientists is, consciously or unconsciously, shaped by the way science is organized. One of these metascientists is British psychologist Marcus Munafò, whom I recently had the chance to interview for the BCN newsletter (see page 14). In the interview Marcus says: “People who are interested in metascience are looking at the way science functions and asking: Can we do better?” Marcus, for instance, suggests moving toward a more diverse system of rewarding outputs and incentivizing open science practices.

Meeting Marcus made me think we should all occasionally take a step back from our own research and become metascientists. To better understand the consequences of our current practices and to think about how we could ourselves be the change we would like to see in science. In the end, that is what my miniature reproducibility crisis did for me: it made me stop and think, not only about my particular field of research, but also about science as a whole.

■ BY JOJANNEKE BASTIAANSEN  
■ PHOTO BY SANDER MARTENS

<sup>1</sup> <http://www.volkskrant.nl/wetenschap/herhaal-en-faal-psychologie-zit-in-eeen-crisis~a4331635/>

<sup>2</sup> <https://www.nrc.nl/nieuws/2015/09/10/psychologie-verkeert-in-eeen-wetenschappelijke-cris-1534821-a673805>

<sup>3</sup> <http://www.nature.com/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970>

<sup>4</sup> <http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.2000995>

<sup>5</sup> <http://www.nature.com/nmat/journal/v4/n1/full/nmat1305.html>

## Intro new staff writer



> CORNÉ HOEKSTRA

After graduating high school, I moved from Leeuwarden (the city where I grew up) to Groningen to do my bachelor’s in psychology. The bachelor programme here in Groningen is very broad and I took courses ranging from social psychology to cognitive neuroscience. Already during the bachelor’s programme, I realised that cognitive psychology was my favourite topic. Breaking apart human cognition and behaviour into separate pieces in order to then try to puzzle them back together, is, for me, the essence of cognitive science. And it is something I enjoy doing very much. Last year, I did the master’s programme in cognitive psychology and psychophysiology (also here in Groningen). And it was during this year that I finally made the decision to apply for the C-track of the research master’s programme. So far, the BCN research master’s programme has been better than I expected. I expected it to be challenging and quite a lot of hard work, and this turned out to be true... But, I was pleasantly surprised by how much I liked it. The large amount of freedom we get to do the projects we want to do ourselves is great. And the collaboration with other students and with teachers/supervisors is terrific. Overall, plenty of reasons for me to want to take a more active role in the BCN community; writing for the BCN newsletter seems to be a good way to do exactly this.

■ PHOTO BY SANDER MARTENS

# Mindwise: The pleasure and privilege of doing cognitive science

I am writing this on my third day as assistant professor in the Experimental Psychology Group at the University of Groningen. And this article is my way to say: hi! I think the best way to introduce myself is to tell you why I think these are exciting times to be a cognitive scientist.

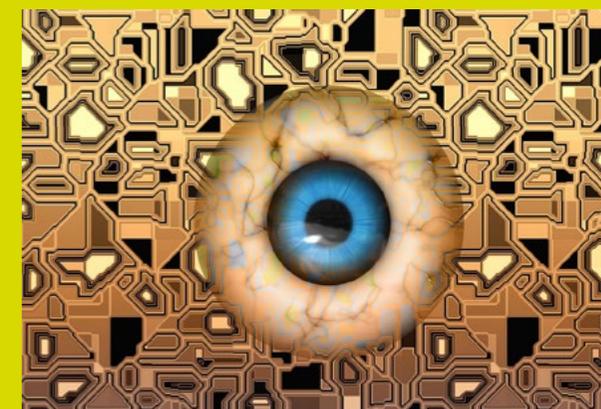


Because that's how I see myself: as an old-school cognitive scientist, or cognitive psychologist, if you prefer; as someone who is interested in how the mind works. To me, cognitive science is about the computations that our mind performs, and not primarily about the details of how and where neurons process information – that's the domain of neuroscience. Granted, neuroscience and cognitive science are related, as is perhaps best illustrated by research on visual perception. Neuroscientists have discovered a lot about how neurons process visual input; for example, they have discovered that there are neurons that respond selectively to particular orientations (i.e. they respond to a line that is tilted by 45° but not – or less so – to a line that is tilted by 90°)<sup>1</sup>. Cognitive scientists have used these discoveries to build cognitive theories of vision; for example, most theories assume that visual input is processed hierarchically, and that orientation processing is one step in this hierarchy<sup>2</sup>. But these cognitive theories are more than just summaries of neuroscientific discoveries: rather, they are attempts to distill, from these discoveries, general principles of how the mind works. And neurons in the brain just happen to be the hardware that runs the mind. But

different hardware – such as a computer – could, presumably, run the same mind.

But wait ... did I call this brand of cognitive science 'old school'? I shouldn't have! Because cognitive science is now more relevant than ever. Take so-called deep neural networks: artificial neural networks that – among many other impressive feats – correctly recognize images about 97% of the time. In other words, they are almost as good as humans at classifying images. How can they do this? Well, these networks are massive, interconnected collections of artificial neurons, which are inspired by neuroscience<sup>3</sup>. But they are not an attempt to copy the details of the brain; rather, they copy general principles of learning and connectivity that seem to govern the mind. And they copy these principles very successfully – cognitive science at its finest!

Many computer scientists would probably balk when I say that deep networks are an achievement of cognitive science – surely they are pure computer science! And, probably, so would many neuroscientists – surely neuroscience is to thank for that we now understand (small parts



of) the brain so well that we can simulate it! But isn't that exactly what makes research exciting? That nowadays computer science, neuroscience, and cognitive science are working together productively toward a better understanding of the human mind.

This is why I feel that this is an exciting time to do cognitive science. Real progress is being made. Even for someone like me who hasn't been in the field for that long, it's clear that things are now progressing faster than they have in many years. I remember that when I started my PhD in 2008, I felt that vision science (my subfield of cognitive science) was, to put it bluntly, a bit like stamp collecting: there were

## &gt;&gt; CONTINUATION OF THE PLEASURE AND PRIVILEGE OF DOING COGNITIVE SCIENCE

many experiments that led to many findings; but I felt that these findings were often isolated, not integrated into theory, and therefore didn't deepen our understanding of the mind. But now I feel that this is slowly changing for the better. To give you an example: a little over a year ago I saw a lecture by Laurent Itti, who works at the frontier between computational neuroscience and cognitive science. Itti's models of visual attention<sup>2</sup> are world-famous; I've used them in my own work as well. In his lecture, Itti showed how he and his team had used insights from cognitive science to build artificial intelligences that could do all kinds of crazy human-like things, such as flawlessly detecting cyclists in a video, or navigating through an environment based on vision alone (look ma, no GPS!).

So how do I hope to contribute to this progress? My own research focuses on vision, eye movements, and pupil size. I find this fascinating, and I'm proud of the small discoveries that I occasionally make – and about which I may tell you more here on Mindwise in the future. But of course my own contribution to science is tiny. Sometime ago, I read an interview with someone – I forgot who, but it was a well-known scientist – who said that only 0.1% of all scientists ever contribute anything substantial. The remaining 99.9% are mostly there to create an environment for this 0.1% to work in; and he thought it unlikely that he would ever be among that 0.1%. And so do I, but that's not terribly important – only someone with even

bolder illusions of grandeur than mine would be bothered by the idea of belonging to the bottom 99.9%. What is important is that society gives us, scientists, the opportunity to play a tiny role in better understanding the world. And that's a pleasure and a privilege.

■ BY SEBASTIAAN MATHÔT  
 ■ IMAGE BY GERALT, LICENSED UNDER CC0

Sebastian Mathôt is an assistant professor in the Department of Psychology of the University of Groningen. He's interested in eye movements and visual perception. Sebastian also develops OpenSesame, an open-source programme to create experiments for psychology, neuroscience, and experimental economics. For more information, [visit his site](#).

**REFERENCES/LINKS**

- <sup>1</sup> In this article, Robert Wurtz talks about the seminal studies by Hubel and Wiesel, who mapped out how neurons in visual cortex respond to visual information.
- <sup>2</sup> In this review, Laurent Itti and Christof Koch discuss the hierarchy of visual processing, which forms the basis of most of Itti's computational models.
- <sup>3</sup> The details of deep neural networks are incredibly complicated, but the general idea is not. In this review, Yann LeCun and his colleagues give an accessible introduction.

## Cool links

- > A beautiful collection of brain images: <http://interstellate.me/>
- > How the brain helps the body fight bacteria: <http://www.iflscience.com/brain/how-the-brain-helps-the-body-fight-bacteria/>
- > A glimpse into the workings of the baby brain: <https://www.sciencedaily.com/releases/2017/01/170111132818.htm>
- > Tumor-seeking salmonella treats brain tumors: <https://www.sciencedaily.com/releases/2017/01/170111102942.htm>



# Domien Beersma retires; a lifetime of research into light, sleep and chronobiology



**The biological clock. It often has, unconsciously, a profound impact on all of us. During daily life, it determines when we prefer to be most active. It determines whether you are an 'early bird' or whether you prefer to be active until late at night. Domien Beersma, a valued BCN researcher, spent a large part of his life researching light, sleep, biological rhythms, and chronobiology. Chronobiology is a field of research that examines daily and annual rhythms in humans and other living organisms and the adaptation of these rhythms to (day)light.**

In 2007, Domien Beersma was appointed professor of Chronobiology. Over a period of 10 years he has led the research

group Chronobiology with great skill. The understandable way Domien can explain a mathematical approach of biological problems is unique and is greatly appreciated by colleagues and especially by his students.

Domien Beersma has made important contributions to sleep research. In 1984, he co-authored with Alex Borbély and Serge Daan a qualitative model on human sleep regulation<sup>1</sup>, by merging a homeostatic process (process S, sleep depth) and the clock-controlled process (daily fluctuating thresholds, process C). To date, this model is still widely referred to by international

sleep researchers. According to Web of Science, the article has been cited approximately 750 times since 1984. But, as befits a modest but excellent researcher, he is the first to admit that his work is not yet finished. There are still some aspects that cannot be explained by the '1984-model'.

Besides a gifted researcher, Domien was also a highly valued lecturer, supervisor and tutor. He has designed and supported a wide range of courses and activities both for the Faculty of Mathematics and Natural Science as well as the Research School of Behavioural and Cognitive Neurosciences (BCN). For several years he has been the coordinator of the BCN Research Master in Behavioural and Cognitive Neurosciences. Throughout his career, Domien supervised 23 PhD students and helped them to successfully defend their thesis.

But, as is true for all of us, even Domien's biological clock kept on ticking and the time

came that retirement knocked on his door. On December 2nd of last year, Domien said goodbye to the working life during a festive gathering in the central hall of the 'Linnaeusborg' at the Zernike Campus, Groningen.

■ BY MICHIEL HOOIVELD AND ROELOF HUT

■ PHOTOS BY ROELOF HUT AND MICHIEL HOOIVELD

#### Also worth reading

- [Early bird or night owl. When do you do your best work? \(UK, 18 January 2017\)](#)
- [BCN Research Master 'Behavioural and Cognitive Neurosciences'](#)

<sup>1</sup> Timing of human sleep – Recovery process gated by a circadian pacemaker

Serge Daan, Domien G.M. Beersma and Alex A. Borbély  
American Journal of Physiology, Vol. 246, R161-R178, 1984



# Groningen – Giessen Meeting on Neuroinflammation

On the 26th and 27th of October last year, Professor Christiane Herden and Dr. Christoph Rummel of the Justus Liebig University (Giessen, Germany) visited the Research School BCN in Groningen. The aim of the meeting was to explore possibilities for collaboration on the topic of neuroinflammation, in light of the pending Deutsche Forschungsgemeinschaft (DFG) Graduiertenkollegs grant (Research Training Group entitled 'Models of inflammatory processes in the nervous system') from the Giessen group, which would offer an opportunity for longer term collaborative projects with the Research School BCN. The DFG grant mainly concerns the education of young

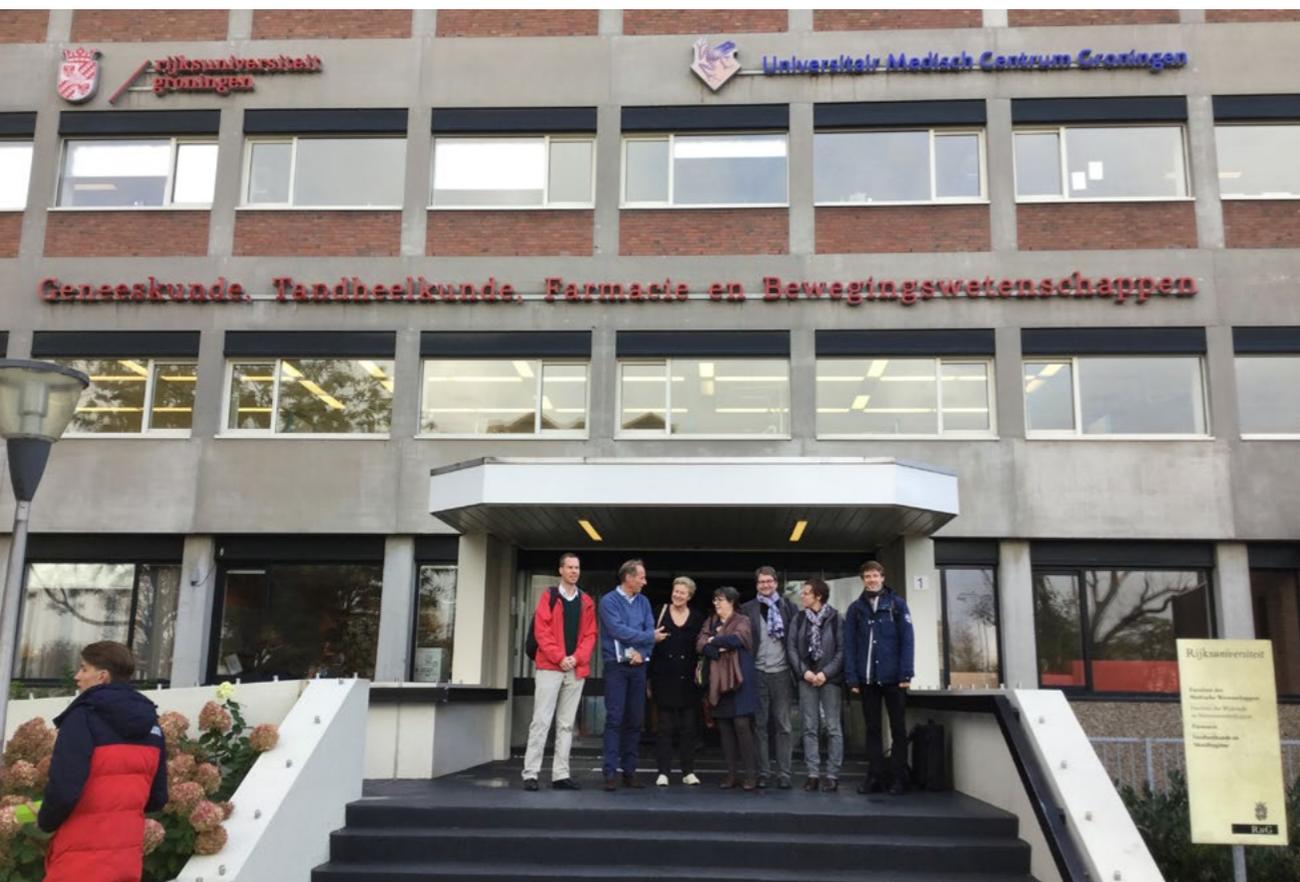
researchers (doctoral students, postdocs), which includes exchange with foreign research groups. Funding would be for 6 years, with the possibility to apply for another 3 years after.

The Giessen University combines life science faculties with veterinary and human medicine and endorses the concept of One Health. Neuroinflammation, especially through the innate immune system across species is the focus of the Giessen researchers. This may offer interesting opportunities for BCN researchers who work on neuroinflammation in both clinical and preclinical / fundamental research.

There are already various collaborations between the two universities. Uli Eisel from Groningen has been collaborating with Christiane Herden for many years in the field of Virology (Borna Virus Infection), Neuroinflammation and Epilepsy. Furthermore, Amalia Dolga is a Groningen Rosalind Franklin fellow who already spends time every year in Giessen and Marburg for teaching Pharmacy/Medicine students and for conducting research with the group of Prof. Carsten Culmsee and Prof. Christoph Rummel. Master students from Philipps-Universität Marburg are also conducting research during their laboratory rotation programme in Groningen. Amalia

Dolga obtained the Habilitation qualification (venia legendi) in 2015 at the Institute of Pharmacology and Clinical Pharmacy, Philipps-Universität Marburg, Marburg, Germany. Since 2006, Uli Eisel and Martina Schmidt have collaborated with various members of Molecular Pharmacology and Neuroscience, resulting in publications in pre-reviewed publications in journals such as Cellular Signaling and Journal of Neuroscience, and several thesis defenses.

■ TEXT AND PHOTOS BY MICHEL HOOIVELD



# New Year's Resolutions

We tentatively take our first steps in to the new year of 2017: will it make us or will it break us? This period is perceived by many people as a fresh start, a new beginning. New Year's resolutions are more notorious for how quickly and often they are broken than for their resoluteness. I could not help but wonder what has been written from a scientific perspective on this subject? Pubmed yields a hit frequency of 66 papers when pressed to show anything on "New Year's resolutions". The first hit is a very clever advertisement of the so-called British Veterinary Association. The abstract reads: "January is traditionally a time for making New Year's resolutions. This year, why not resolve to get more out of your BVA Membership? Here are some ideas to help you do just that." The second hit is a more tale telling abstract since it appears to be empty. A blank slate, or is this proof of a rare quality of adequate self-assessment? All there is to it, is an author's name, a journal and the title "New Year's Resolutions". It does disappoint however, because when you click on the full text link, it is a rather dreary sum up of an oncologist on how she is planning to be a better doctor to her patients. The sentiment notwithstanding, so far this search hasn't yielded any 'significant' results. Even Nature has contributed to this list, but not scientifically so. Around half of the papers coming up in this search are a resolute sounding list of business-related intentions of improvement for the coming year. The other half ironically challenges the concept and highlight, clear from the titles alone, its notoriety for failing us. The scientific community is clearly in two minds about this.

A prospective study (Nocross et al., 1989) showed

that readiness to change and self-efficacy were the most important predictors of a successful outcome at one week and at one month. They stayed on the safe side by keeping the statistical representation of their study confined to the periods of one week and one month it appears. In addition to having more of the aforementioned qualities, having less self-blame and wishful thinking took them over the finish line. Social support or behavioural skills were not related to a successful outcome. Interestingly enough, these are the characteristics most people blame their failure on.

We all have the best intentions, but at some point intentions must morph into a plan of action. The blame for failing to turn intentions into action is put on procrastination by a Canadian professor named Pychyl. He leads a research group on procrastination (<http://www.procrastination.ca/>). I am a bit confused however that on the first page, after a short explanation of their intentions to do research, they actually list several publications. I start to wonder how much they really know about procrastination from personal experience.

It might seem obvious that New Year's resolutions should cover one's own behaviour or mind set. It is undoubtedly more fun to try and change the views of your neighbour about the dog poop your companion left in his yard; it is also more likely to not yield results. fMRI provides us with some insight in the importance of this statement. Brain activation reflects whether we are considering self-relevant traits or traits relevant to someone else. It appears that 'other-relevance' is accompanied by a decrease in activation of cortical midline structures (MPFFC, rACC)(Northoff et al., 2006). The same decrease in

neuronal activation emerges when we think about our 'past-self' (D'Argembeau et al., 2008). This means that a similar pattern of activation arises when we make judgements about the past-self and another person. What does this mean for our resolutions and how does this affect our future self? Research from Hershfield et al. (2011) indeed confirmed that the activation related to thinking about other people and the past-self matches the activation pattern of the future-self. In addition, it was possible to predict behaviour favouring the present- or future-self, based on the difference in neural activation. It appears that in terms of neural activation we represent our future-self as another person. Since not all of us are very accomplished at loving our neighbour as we love ourselves, it might indicate why we are less willing to make changes that will favour our future-self, especially if it causes any discomfort for the current-self. In some way we do love our neighbours like we love ourselves. Just as we are not willing to walk an extra block to avoid our dog defouling their yard, we are equally unlikely to want to walk an extra block to decrease our own chance of developing health problems. This makes sense now.

In conclusion, a very small body of knowledge directly tailored to our need for New Year's resolutions does not give a conclusive insight in whether we should or should not make New Year's resolutions. Regardless of scientific evidence, we made it a yearly tradition which on its own might tell us enough about the probability of success.

■ BY ELOUISE KOOPS

■ PHOTO BY SANDER MARTENS



# Winter meeting

On February 16th the BCN Winter Meeting took place. An impression...

PHOTOS BY SANDER MARTENS AND MICHEL HOOIVELD

**"IT AIN'T NUTHIN' BUT A 'G' THANG"**  
Rap flows as evidence for the connection between language and music

**STEVEN GILBERS**  
UNIVERSITY OF GROWINGEN

**Representin' through language and music**  
In hip-hop culture, regional affiliation is key to people's sense of identity

**Language** To express regional identity hip-hop aficionados employ regional accents of African American English (AAE)  
**Music** Rappers use distinct regional rapping styles to 'represent'

**Speech prosody** Rhythm and 'melody' of speech  
**Rap 'flow'** Rhythm and 'melody' of rap

**Does regional prosody inform regional rap flows?**

**Melody**  
Phonetic analysis  
Pitch in sentences (per 10 ms)

West Coast subjects	East Coast subjects	Materials
Dr. Dre, Game, Ice Cube, Snoop Dogg	50 Cent, Biggie, Jay-Z, Nas	Interviews and a rap-style rap verse

**West Coast**  
Pitch fluctuation (speech and rap)

**East Coast**  
Pitch fluctuation (speech and rap)

**Results**  
West Coast AAE more melodic than East Coast AAE  
West Coast rap more melodic than East Coast rap

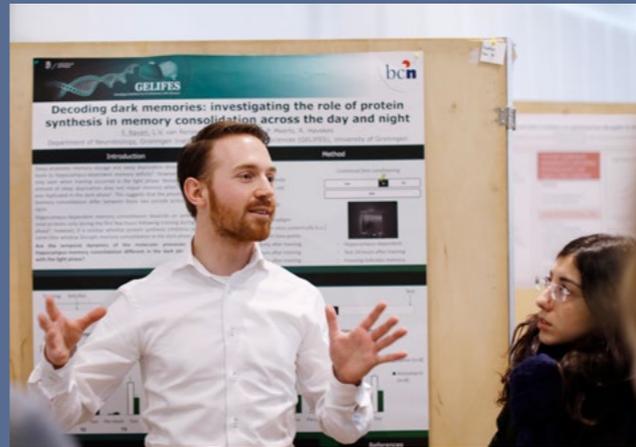
	West Coast	East Coast
Speech	315	267
Rap	359	310

**Language-music connection**  
Pitch data suggest intricate relationship between regional dialects and rap styles

**Rhythm**  
Are East Coast rhythms more rigid than West Coast rhythms?



>> CONTINUATION OF WINTER MEETING



# Should I stay or should I go?

When I first started writing for this Newsletter, it was not to build my CV or improve my writing skills (although it does help with both). Rather, it was to ensure I was able to write something other than academic articles during my PhD. You might recognize the feeling: that (sometimes desperate) need of a moment to focus on something other than your research. Although I know that this feeling can appear due to a work overload, I generally think it points to something very important to realize and embrace: the fact that having multiple interests is natural and healthy. This might seem obvious, but ignoring this naturally diverse drive, in my opinion, directly relates to an issue all PhDs will face at some point, the anxiety experienced from trying to decide whether to stay or leave academia after completing a doctoral thesis.

In the beginning of my PhD, I was not sure whether I would enjoy working on research. As a matter of fact, I did not even know if the topic I had chosen was going to be as interesting as

> *I believe most PhDs reading this will identify with it.* <

it sounded. Yet, I thought it would not hurt to give it a try. Luckily I did enjoy it, and it was very interesting. Yet, life as a PhD started to become some sort of a love/hate relationship (which is a feeling I recognized in many of my PhD friends as well). From the excitement of understanding my data through the depths of the impostor-syndrome, the number of times I asked myself whether I was in the right place were plenty – as were the days when I could not imagine myself doing anything else. This might seem very unstable, but I believe most PhDs reading this will identify with it. In any case, whether you do recognize the feeling or not, I am sure of one thing: questioning yourself about whether or not to pursue an academic career has definitely been a big part of the process. It should have, in any case; after all, we all love to have a plan, and that includes knowing what to do next. However, what if you are stuck in the love/hate roller-coaster and have genuinely no idea what you want to do after you finish? Personally, I believe that as scientists, if there is one thing we should be used to, it is the unknown. Ironically, though, when it comes to our own life decisions, most of us do not feel comfortable with the unknown. Certainly not when it comes to our careers, and especially

when it involves constantly hearing about how difficult it is to remain and further develop in academia, for example.

Since I just finished my PhD, I was faced with

those questions extremely often in the past few months. Despite enjoying research, most of the times my answer did not go any further than “who knows?”, followed by a nervous laughter. The nervousness came from the idea that to go



## &gt;&gt; CONTINUATION OF SHOULD I STAY OR SHOULD I GO?

> *If there is one thing we should be used to, it is the unknown.* <

further I had to be excellent, and the impostor-syndrome did not help in this case. It also came from fear of missing out on other experiences; I could not help to think that maybe I would be happier in a different field, or in working with another one of my many interests. Because I did not know what to do next, I decided to go after a number of different opportunities and to not scratch any ideas of the list. At the end, I was lucky enough to be offered a postdoc position (which I happily accepted!).

Yet, if you ask me now what I want to do next, my answer will still be “who knows?” – although maybe followed by a more relaxed smile. Yes, I am glad I have the opportunity to keep doing research, but my interests go way beyond the topic I currently work on, and that being the case, I see no point in closing future doors. It is very rare that someone follows a linear trajectory in their career, and, in fact, I believe that having a broad range of experiences is often very advantageous in this complex and dynamic world we live in. Having this in mind, my opinion is that deciding whether or not to stay in academia should not be so scary (or definitive). Yet, if you do not feel like trusting your gut and embracing the “who knows?” answer, the best way to get closer

to a clear goal is to do as I did with joining this Newsletter: getting out there, trying new things, exploring opportunities and learning what makes you happy in your daily life. Do not get me wrong: work is far from being all that matters in this life, but it should be pleasurable – and you’ll only find pleasurable work if you know what that means for you. Yes, others will tell you how difficult it is to excel in academia, or how pursuing a postdoc is no advantage for transitioning into the industry and how you should leave early rather than late. Yet, despite the relevance of building on other people’s experiences, basing a personal decision on the

> *I see no point in closing future doors.* <

successes and failures of others is, to me, not a smart move. Make sure to understand and pursue what you want, and if that changes, remember the existence of non-linear paths and allow the decision to change with it. After all, a career is not static, and neither is the decision on staying or leaving academia – it is a dynamic process that should follow a person’s naturally changing interests.

As I say goodbye to this Newsletter and hello to my new academic position and challenge, I am certain of at least one thing: this is just one more change I am happy to embrace, and whatever the future brings, not knowing where it will ultimately lead is part of the fun.

■ TEXT AND PHOTO BY ISADORA ALVES



WWW.PHDCOMICS.COM

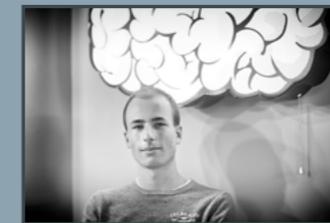


# New staff writers wanted!

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!](mailto:sander.martens@gmail.com)



## > GRAND STUFF

### Lizanne Schveren – cum laude promotion

On December 14, 2017 Lizanne Schveren was promoted cum laude with her thesis 'Stimulants and the developing brain'.

### Max Gruber Prize

Researcher Balaji Srinivasan was granted the Max Gruber Prize, which he will receive on January 17.

The Max Gruber Prize is a biannual prize awarded by the University of Groningen for the best peer-reviewed publication by a PhD student at the University of Groningen in the fields of biochemistry and cell biology. Blaji Srinivasan (1985) was promoted in 2015 at the University of Groningen with his research on metabolic product Co-enzym A (CoA).

### Merel Keijzer joins De Jonge Akademie (The Young Academy; DJA)

The DJA is a platform within the Royal Netherlands Academy of Arts and Sciences (KNAW) for young, world-class scientists and scholars with an innovative vision on science and scholarship and related policy. The DJA organizes inspirational activities for various target groups in the field of science and scholarship communication. Every year the DJA selects 10 new members from researchers who received a PhD less than 10 years ago.



■ PHOTO BY RONALD ZIJLSTRA

Merel Keijzer is one of them. She is an Assistant Professor in the Department of Applied Linguistics, where she specializes in the cognitive and language control of bilinguals across the lifespan, with a special focus on bilingualism and cognitive ageing. Employing both behavioural and neuroimaging techniques, she is particularly interested in establishing how patterns in individual bilingual language use affect the type and magnitude of cognitive advantage that is found in advanced age. She also studies how bilingual language use can be isolated from other factors that enhance cognitive reserve, such as musical training, stimulating social activities, and physical exercise.

#### More information

<http://www.rug.nl/news/2016/12/three-ug-researchers-join-de-jonge-akademie>

### DTEC grant awarded for Visual Storytelling of Big Imaging Data

The Scientific Visualization & Computer Graphics group of the Johann Bernoulli Institute (PI Prof. Jos Roerdink) has been awarded an EUR 260,000 grant for the project "Visual Storytelling of Big Imaging Data" under the call "Disruptive Technologies (DTEC) / Joint eScience and Data Science across Top Sectors" from the Netherlands eScience Center (NLeSC), NWO-EW, and Dutch Digital Delta. Partners in the project are the University Medical Center Groningen (UMCG) and the University's Centre for Information Technology (CIT).



■ PHOTO BY RUG.NL

>> Have you recently received any grants, prizes, or remarkable media coverage? Please let us know (E.T.Kuiper-Drenth@umcg.nl) and we will try to cover it here!

## &gt; PHD COUNCIL

# News from the BCN PhD council

On 8 December 2016, we organized a 'borrel' (Dutch for 'drinks') for the first time in a long while. In order to make it more special, we fueled it with Christmas spirit and added a lottery as well. We're happy that lots of you showed up, and we hope that you all had a great time getting to know each other and meeting up with friends and colleagues. This borrel was also the first activity to which the BCN research master students were invited. As the council, we strongly believe that our activities should also be open for master students as we share much of the same interests. In the near future, we hope to get permission from the board to invite them for more activities and let them join the council as well. Given the success of this borrel and your positive remarks, we're definitely planning to organize more borrels in the future.

Along with the activities, we also want to announce that we have three new members! Since October, **Azzurra Invernizzi** (Visual Neuroscience, UMCG), **Laura Kracht** (Medical Physiology, UMCG), and **Javier Gustavo Villamil Ortiz** (Medical Physiology, UMCG) have joined the council.

If you have suggestions for new activities, for speakers you want to attract (for e.g. seminars or master classes), or for anything else, do not hesitate to contact us at: [bcnphdcouncil@list.rug.nl](mailto:bcnphdcouncil@list.rug.nl)



## &gt; PHD COLUMN

# Trying to be like a botanical garden in busy Copenhagen

I spent six weeks in Copenhagen to analyse an interesting fMRI dataset. It was actually the first time I was working abroad for a longer period of time. Long enough to get to know the people and to get a feel how their lab works, but short enough to not miss my boyfriend and family a lot. It is less than one hour by plane, seven hours by car or, according to my friends calculations, only three days by bicycle.

As Copenhagen is so close, it is not surprising that there are a lot of similarities with the Netherlands. The weather for example, with thick grey clouds and an occasional rain shower. Another similarity was that I didn't look as a foreigner apparently, as Danish strangers would ask me the road a number of times. I assume that was what they were asking me, as I could not understand anything of what they were saying in Danish. My Dutch promotor assured me that Danish was actually easy to learn, but then again, he can't make a conversation with his Chinese PhD students in Chinese. Luckily, the Danes speak English perfectly. They also eat lunch at the same time as I'm used to. At precisely twelve, someone yelled 'frokost!'. You dropped your work immediately, otherwise you would have to find the restaurant on your own, which was a challenge. The hospital I was working at was just as confusing as the UMCG. Only after two weeks I was confident that I wouldn't get lost forever. Arriving at the restaurant, you could get delicious salads, potatoes, rice, pasta, and typical Danish meet dishes. Something else than the Dutch cheese sandwich.

I wasn't bored a single day. Copenhagen is full of castles, palaces and museums with buildings as beautiful as the exhibitions themselves. But by far, my favourite place of the entire city was the Botanical garden, a little piece of nature two streets from my room. It's a beautiful park with high trees and small hidden paths you can discover. A name tag is placed under every bush and tree, making my inner biologist smile. It surprised me how relaxing it was to just stroll around and watch a squirrel climb up in a tree. At the beginning of the park, a small cosy shop sells all kinds of fun stuff: Christmas ornaments in the form of fruits and veggies, postcards with drawings of plants, pencils that will grow into herbs if you plant them. In the middle of the park there is a beautiful big greenhouse, with palm trees and bamboo in tropical temperatures. The perfect place to defrost your toes on from the cold outside.

One interesting difference between Groningen and Copenhagen was that the Danish PhD working days are around 7 or 7,5 hours. That is definitely shorter than the average PhD work day in Groningen. It reminded me of a news article about an experiment in Sweden. They completed a trial in December 2016 in which working hours of nurses were reduced to 6 hours for a duration of 23 months. Although the final results are yet to be published, the preliminary results show that, compared to a reference residential home, 18 months of 6-hour work days resulted in a reduced sick

leave, a higher perceived health and alertness, and a higher percentage of performed work activities. How does this work? If you work less hours, you get less done, right? It seems that the increased amount of free time actually increases the productivity of the nurses. This may show that productivity and relaxation are tightly connected with each other.

A couple of months ago, I was feeling demotivated and tired all the time, and felt I became less and less productive. This despite the fact that I had no major problems with my PhD and everything seemed to be going alright. Someone asked me: 'Maybe you just need a vacation?' and she was right. Sometimes we forget that taking a break or getting some rest actually improves our focus, our energy level and our productivity. Taking more rest during busy weeks actually helps you to get through that endless to-do list. And importantly, do not feel guilty about taking time off. Maybe that is the most difficult part for a lot of PhD students. Not feeling guilty when you leave earlier than your colleagues. Not have the constant feeling you should work during the weekend, because your week wasn't productive enough. Sometimes you just have to take a step back, take a walk through the park and breath.

With a suitcase full of reminders of my time here (including a strawberry Christmas tree ornament), I am now back in Groningen. It is still difficult to get that relaxed feeling back that I had in the botanical garden, but I am trying. Maybe all universities should be located



in the middle of a park, so that you get some fresh oxygen to your brain during a break. Nevertheless, my 2017 resolution will be to find a focused mindset more often, maybe by taking a little more rest.

■ BY MANON VAN ASSELT

Link to the abstract of the 6-hour work day trial in Svartedal, Sweden:

<http://sverigesradio.se/diverse/appdata/isidor/files/104/757fe9ed-702f-401a-b275-c3c45fcfae99.pdf>

## > PHD AND OTHER NEWS

### Winner of the BCN Dissertation Award

The winner of the 2015-2016 BCN Dissertation Award is Sanne Booij. Her dissertation, entitled "Dynamics of the human stress system in depression. A combined population- and person-based approach to assess long-term changes and daily life fluctuations", was chosen as the best of the 8 nominations. Sanne Booij was a PhD student at the Academic Centre of Psychiatry. In the BCN Newsletter 103, you will find a double interview with Sanne Booij and Maaïke Meurs. The committee also considered the theses of Kashmiri Stec and Inge Holtman to be very impressive BCN dissertations!

### Winner of the BCN Summary Award

Like last year we had a double winner: Sanne Booij not only won the BCN Dissertation Award 2015-2016 but also the 2015-2016 BCN Dissertation Summary Award. Her summary was chosen as the best of all submitted summaries. The summaries of all BCN dissertation from the past academic year are printed in the booklet "To the Point". Please contact me if you would like to receive a copy.

### Flyer BCN Master

BCN made a new flyer for the BCN Master. If you would like to take these with you when you are going to a conference or meeting, please ask for some copies. Promote our master's programme wherever you like!

### Agenda BCN Activities

March 23-24, 2017: **BCN Retreat**

June 19, 20, 27, 28 and 29: **BCN Statistics Course**

Application: <http://cursus.webhosting.rug.nl/gsms>

Please check the website for detailed information.

■ BY DIANA KOOPMANS

## MSc Behavioural and Cognitive Neurosciences (Research Master)

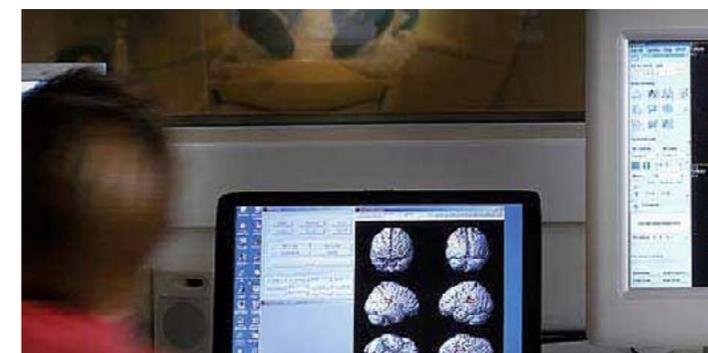


### Key facts

- › Start programme: 1 September
- › Duration: 24 months
- › Tuition fees EU / non-EU: approx. €2,006 / €14,200

### Courses

Functional Neuroscience  
Stem Cell & Glia Biology  
Function & Evolution of Behaviour



### GENERAL INFORMATION

Are you interested in the basis of consciousness, the mechanisms of learning, the genetics of behaviour or the molecular mechanisms underlying neurodegeneration? In this programme you study the brain, cognition and behaviour from different perspectives.

The main focus of this Research Master is to train students to become independent researchers. For this purpose, a large proportion of the programme is devoted to two research projects in which the students are embedded in successful research groups to conduct their own research.

The programme offers three tracks:

- › Animal and Human Behavioural Neuroscience (B-track);
- › Cognitive Neuroscience and Cognitive Modelling (C-track);
- › Molecular and Clinical Neuroscience (N-track).

You will become an expert in one of these fields. However, because of the integrated courses and links between these tracks you will also get a unique inter-disciplinary training allowing you to becoming a true neuroscientist.

The BCN Research Master is one of the the best Neuroscience MSc programmes of the Netherlands (Keuzegids Masters 2015/Dutch Higher Education Guide 2015).

Admission to the programme is selective and based on the applicants academic credentials as well as motivation.

### Career prospects

- › PhD candidate
- › Research-oriented job
- › Healthcare or IT consultancy

### More information

Programme website  
[www.rug.nl/fwn/MSc\\_BCN](http://www.rug.nl/fwn/MSc_BCN)  
Questions?  
[sciencemasters@rug.nl](mailto:sciencemasters@rug.nl)  
Facebook  
[/sciencestudentsuniversityofgroningen](https://www.facebook.com/sciencestudentsuniversityofgroningen)

### WHY CHOOSE US?

- › Integrated teaching in small groups by top researchers from five faculties
- › More than 75% of the students have a job (in science) at the end of the programme

### Application

You can apply online, please go to [www.rug.nl/howtoapply](http://www.rug.nl/howtoapply)

Application deadline EU: 1 May  
Application deadline non-EU: 1 May

### Admission

- › Bachelor's degree in Behavioural, Cognitive and/or Neurosciences field
- › Admission is selective
- › English proficiency: TOEFL 580/237/92, IELTS 6.5
- › Letter of motivation

Please visit our [website](http://www.rug.nl) for detailed information.

## > ORATIONS

### **The challenge of searching in the dark; on our way to a tipping point in the field of psychiatry**

#### ORATION

M.C. Wichers

#### TITLE

The challenge of searching in the dark; on our way to a tipping point in the field of psychiatry

#### CHAIR

Dynamics of emotion regulation and psychopathology

#### FACULTY

Medical Sciences

#### DATE

December 6, 2016

Within the field of psychiatry, we are in urgent need of knowledge that helps to improve patient-specific decisions. We want to know who will or will not develop psychopathology, how people exactly recover from this, and what patients benefit from which forms of treatment. But, are we looking for the solutions in the right way? Don't we need other research designs than that we now often use to find solutions? That question is central in this inaugural lecture. An example is that we hardly have used research designs within psychiatry that can map the complete processes of change in symptoms in detail and within persons. This is an important gap in our field and necessary to unravel why symptoms arise or disappear. In the coming years, I would like to try to map these dynamic processes and thereby follow the development

of and disappearance of symptoms 'live' as it occurs over time in people. Such a novel design will also allow for the empirical testing of some new and exciting ideas. For example, with this design we can test whether the way mental disorders behave conforms to the principles of complex dynamic systems. Within such systems it is possible to detect certain warning signals, which are indicators that a tipping point in the system is approaching and, thus, that a transition is coming up. If this would also apply to transitions in symptoms, then this would drastically improve our ability to anticipate large transitions in psychopathology. We will use a non-traditional time-series design with which we follow patient-specific processes. Therefore, these results may lead to patient-specific risk-assessments, which will strengthen the translation of these findings to the clinic. In short, I argue that we should not ignore the presence of complexity by using too simplistic research designs. A higher level of complexity in our models and research designs may be necessary to find novel solutions within the field of psychiatry.

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



## > PROMOTIONS

### Perception of amplitude modulation with single or multiple channels in cochlear implant users

PHD STUDENT

J. Galvin

THESIS

Perception of amplitude modulation with single or multiple channels in cochlear implant users

PROMOTORS

Prof.dr. D. Baskent

Prof.dr. Q-J. Fu

FACULTY

Medical Sciences

Cochlear implants (CIs) are able to restore hearing to many deaf individuals. Contemporary CIs work by converting acoustic signals into pulse trains of electric current delivered to the implanted electrodes. These pulse trains are amplitude-modulated by the changes in energy over time associated with the input signal. CI users' perception of amplitude modulation (AM) relates strongly to speech perception. However, perception of AM might be quite different when delivered to a single electrode (as in most previous studies) or to multiple electrodes (as in this thesis).

We studied two forms of AM perception: 1) AM detection (sensitivity to changes in amplitude over time relative to steady pulse trains), and 2) AM discrimination (sensitivity to changes in AM frequency for modulated pulse trains). In clinical fitting of CIs, current levels on single electrodes

must often be reduced to accommodate multi-electrode stimulation ("multi-channel loudness summation").

We found that these current level reductions may worsen multi-electrode AM detection, relative to AM detection on an equally loud single electrode. However, these current level reductions did not affect multi-electrode AM discrimination, where performance was similar between equally loud single- and multi-electrode stimuli. When different AM information was delivered to multiple electrodes, AM discrimination depended on the spacing of electrodes. When electrodes were closely spaced, CI listeners were very sensitive to differences in AM information delivered to the multiple channels.

The results suggest that loudness summation and spacing of electrodes may greatly affect AM perception with multiple electrodes.

**John Galvin** (1963) studied medicine at Hampshire College in Massachusetts (United States). He did his doctoral research in the Department of Othorinolaryngology and the research institute BCN-BRAIN of the University Medical Center Groningen. The research was financed by the National Institutes of Health (NIH), NWO and ZonMw, and a Rosalind Franklin scholarship. He now works as a researcher at the University of California Los Angeles (UCLA) in the United States. He was promoted on October 24, 2016.

### Listening Effort: The hidden costs and benefits of cochlear implants

PHD STUDENT

C. Pals

THESIS

Listening Effort: The hidden costs and benefits of cochlear implants

PROMOTOR

Prof.dr. D. Baskent

COPROMOTOR

Dr. A. Sarampalis

FACULTY

Medical Sciences

Speech understanding in ideal listening conditions can seem quite effortless for normal hearing listeners. For deaf people with a cochlear implant (CI), however, the incoming speech is degraded compared to normal hearing due to limitations of the device, the health of the auditory nerve, and the device-nerve interface. Such degraded speech, even when fully intelligible, can be more effortful to interpret than clear speech, especially in challenging conditions, but perhaps even in favourable ones. Although high listening effort is not directly apparent to the outside observer, it has consequences for the listener:



■ PHOTO BY WOUTER BREM

## &gt;&gt; CONTINUATION PROMOTIONS

high listening effort can lead to difficulties performing concurrent tasks, remembering the heard speech correctly, and may in the long term lead to fatigue and increased stress-related sick-leave from work. CI users experiencing such problems can therefore benefit from reduced listening effort.

The results of our research show that improved quality of the speech signal, for example due to increased spectral resolution or additional low-frequency acoustic sound, can improve listening effort. Even when speech understanding remains unchanged, either because intelligibility reaches a ceiling or because it is (artificially) fixed using noise, improvements in listening effort can still occur. This illustrates the importance of measuring listening effort in addition to the traditional measures speech understanding. A reliable measure of listening effort can be useful in scientific research, to investigate which factors affect listening effort and identify effective strategies to improve listening effort, as well as in clinical settings, to fit CIs for minimal listening effort.

**Carina Pals** (1977) got her master's degree in Artificial Intelligence at the University of Groningen. She did her research in the Department of Otorhinolaryngology and the research institute BCN-BRAIN of the University Medical Center Groningen. The research was financed by Cochlear Ltd. She was promoted on October 26, 2016.

### The effect of music on auditory perception in cochlear-implant users and normal-hearing listeners

PHD STUDENT

C.D. Fuller

THESIS

The effect of music on auditory perception in cochlear-implant users and normal-hearing listeners

PROMOTORS

Prof.dr. D. Baskent

Prof.dr. B.F.A.M. van der Laan

COPROMOTOR

Dr. R.H. Free

FACULTY

Medical Sciences

Cochlear implants (CIs) are auditory prostheses for severely deaf people not benefitting from conventional hearing aids. Speech perception is reasonably good with CIs; other signals such as music perception are challenging. First, the perception of music and music related perception in CI users was tested. Second, the potential positive influence of musical training on auditory perception was investigated.

The enjoyment of music in CI users was suboptimal. Identifying vocal emotions (angry or sad?) was shown to be deprived; the categorization of the gender of a talker (male or female?) was abnormal. All auditory signals that are useful in daily life cause problematic communication for CI users.

Musicians are known to have benefits from their auditory perception. We tested if musicians were hearing better when listening to CI simulations. A benefit was found for emotion identification, gender classification and melody identification. Musical training could thus enhance auditory perception in CI users. To test if auditory perception in actual CI users could be improved, we conducted a small training study. During 6 weeks, CI users were musically trained, received music therapy or non-music related training. We found effects of musical training on melody identification and of music therapy on emotion identification. Subjectively, the CI users in the music therapy group indicated that they enjoyed music more.

Our studies showed that music enjoyment and the perception of vocal gender and emotion can be improved in CI users. To improve such auditory perception, musical training might be added to the rehabilitation of CI users.

**Christina Fuller** (1985) studied Dutch language and culture and Medicine at the University of Groningen. She did her research in the Department of Otorhinolaryngology and the research institute BCN-BRAIN of the University Medical Center Groningen. The research was financed by Agiko. She is now a doctor in training in Otorhinolaryngology at the University Medical Center Groningen. She was promoted on October 26, 2016.



■ PHOTO BY FREEK DIKKERS

## &gt;&gt; CONTINUATION PROMOTIONS

### Homonymous hemianopia: Impact on daily life and the effects of scanning training on mobility

## PHD STUDENT

G.A. de Haan

## THESIS

Homonymous hemianopia: Impact on daily life and the effects of scanning training on mobility

## PROMOTORS

Prof.dr. W.H. Brouwer

Prof.dr. O.M. Tucha

## COPROMOTORS

Dr. J.H.C. Heutink

Dr. B.J.M. Melis-Dankers

## FACULTY

Behavioural and Social Sciences

Homonymous hemianopia (blindness for the left or the right half of the visual field) is a common consequence of posterior brain damage. This thesis focuses on the impact of hemianopia on daily living, and more specifically, on mobility-related activities. The thesis describes the results of a systematic review of the scientific literature and an empirical study in which 54 people with hemianopia and 25 healthy control subjects participated. The review of the literature on hemianopia indicated that previous research has barely focused on the impact of hemianopia on functioning in daily life. The difficulties people with hemianopia experience in daily life were systematically studied in the first part of the empirical study. Second, the impact of hemianopia on car driving performance was assessed, showing that some people are able to compensate for their visual field loss effectively and are practically fit to drive. In the third part

of the study, a randomized controlled trial was performed which examined the effects of a newly developed compensatory scanning training (InSight-Hemianopia Compensatory Scanning Training: IH-CST) on mobility in daily life. The study has resulted in an evidence-based training protocol for improving mobility-related activities in people with hemianopia. The thesis contributes to more effective assessments and rehabilitation programs for people with hemianopia, with the ultimate goal of improving mobility-related activities in daily life and participation in society.



■ PHOTO BY M. SPOLETINI

**Gera de Haan** (1987) did her doctoral research in the Faculty of Behavioural and Social Sciences. It was financed by ZonMw, the University of Groningen and Royal Visio. Now she is a postdoc researcher and neuropsychologist at the University of Groningen and Royal Visio. She was promoted on October 27, 2016.

### Growth factors, cytokines and VEGF in human neoplastic and inflammatory pathologies: Immunohistochemical basis for nuclear medicine studies

## PHD STUDENT

M. Artico

## THESIS

Growth factors, cytokines and VEGF in human neoplastic and inflammatory pathologies: Immunohistochemical basis for nuclear medicine studies

## PROMOTORS

Prof.dr. A. Signore

Prof.dr. R.A. Dierckx

## FACULTY

Medical Sciences

Despite the success of antiangiogenic therapy, a large percentage of patients do not benefit from this targeted therapy. Currently, it is impossible to predict which patient will benefit from antiangiogenic therapy. Reasons for treatment failure may be that the target for the drug is not present or that the drug may not reach the target. Tumor cells produce VEGF, which can lead to paracrine effects in the microenvironment. VEGF121 is freely

soluble, whereas VEGF165 is secreted, though a significant fraction remains localized to the extracellular matrix, such as VEGF189 and VEGF206. This will most likely lead to locally high VEGF levels. It is currently impossible to evaluate these local VEGF levels. Noninvasive measurement of VEGF in the tumor (IHC, PCR, Western blotting) might give insight to the available target for VEGF-dependent antiangiogenic therapy and thus assist in tumor response prediction. Moreover, growth factors and cytokines expression in normal and pathological tissues substantially changes in different clinical and physiological conditions. These variations (whose different tissue expressions may be effectively studied by immunohistochemistry) are important and constitute the biological basis for a correct tissue analysis. The last one may represent a previous modality screening and a precious therapeutical support in order to ameliorate the knowledge of nuclear medicine targets in oncological patients.

**Marco Artico** (1962) first studied Medicine and Surgery and after that Pharmacy at the Sapienza University of Rome. Next he worked at the Sapienza University as a teacher and researcher. Artico did his doctoral thesis in the research programme CMI (Center for Medical Imaging) of the University Medical Center Groningen. After his thesis defense, Artico will be appointed as Professor of Human Anatomy at the Sapienza University, who also financed the research. He was promoted on October 31, 2016.

## &gt;&gt; CONTINUATION PROMOTIONS

## Quantitative diffusion-weighted imaging in breast and liver tissue

P H D S T U D E N T

H. Dijkstra

T H E S I S

Quantitative diffusion-weighted imaging in breast and liver tissue

P R O M O T O R

Prof.dr. M. Oudkerk

C O P R O M O T O R

Dr. P.E. Sijens

F A C U L T Y

Medical Sciences

Diffusion-weighted imaging (DWI) is a biomedical application of MRI, based on diffusion (random walk) of hydrogen protons in the human body. By visual inspection of DWI, and other MRI images, the radiologist determines whether there is any pathology present in the organ examined.

Visual assessment is subjective. Quantitative analysis provides an objective alternative for assessing the diffusion of pathology by expressing it in a number in comparison with healthy tissue. The benefit of this approach is that it does not depend on the reader.

Two models for quantitative analysis of diffusion in the liver and breast were investigated. The intravoxel incoherent motion (IVIM) model separates diffusion into slow and fast diffusion. Fast diffusion is present in highly perfused tissues, such as tumors. The second model describes only one parameter, the apparent diffusion coefficient (ADC). Benefits and drawbacks of both models were investigated in



■ PHOTO BY HILDEBRAND DIJKSTRA

DWI studies of the liver. Diffusion is dependent on the hepatic fat fraction, and the ADC furthermore on the measurement location in the liver.

A novel method was introduced for semi-automatic selection and analysis of breast lesions. This provides better discrimination between benign and malignant breast lesions compared to the ADC. Moreover, the method appeared independent of the reader. In daily practice, a group of patients suspected of breast cancer is subject to an invasive procedure to provide a diagnosis. The number of invasive procedures may be reduced in the future when IVIM is implemented in the diagnostic algorithm.

**Hildebrand Dijkstra** (1983) studied Technical Science at the University of Groningen. Since 2006, he has been working as a Clinical Physicist at the University Medical Center Groningen. During his doctoral research, Dijkstra was involved with the research institute BCN-BRAIN en research programme CMI (Center for Medical Imaging) of the University Medical Center Groningen. He was promoted on November 2, 2016.

## Infants at high risk of cerebral palsy: Neuromotor characteristics and the effect of the early intervention programme COPCA

P H D S T U D E N T

E.G. Hamer

T H E S I S

Infants at high risk of cerebral palsy: Neuromotor characteristics and the effect of the early intervention programme COPCA

P R O M O T O R S

Prof.dr. M. Hadders-Algra

Prof.dr. A.F. Bos

F A C U L T Y

Medical Sciences

Worldwide over 140 million babies are born each year. Most of them are healthy and will develop typically, but some infants are at risk of neurodevelopmental disorders like cerebral palsy.

The primary aim of this thesis was to enhance the identification of infants at risk of cerebral palsy (CP) and to improve prediction of

future neurodevelopment. To this end, we first reviewed the literature on the predictive value of specific neurological signs in high-risk infants. Next, we explored possible relationships between slow pupillary light responses and type of brain lesion and developmental outcome. We analyzed knee jerk responses by means of surface electromyography (EMG) in both healthy newborns and high-risk infants, and we investigated whether the development of knee jerk responses was associated with a specific type of brain lesion or diagnosis of CP. Furthermore, we evaluated whether specific movement characteristics could enhance the predictive power of definitely abnormal general movements (GMs).

Our secondary aim was to investigate the effect of the early intervention programme COPCA (COPing with and CAring for infants with special needs – a family centred programme) in infants identified as being at risk of CP. We present the follow-up data of the VIP project (in Dutch: Vroegtijdig Interventie Project) and the research design of the LEARN2MOVE 0-2 (L2M 0-2) years study.

**Elisa Hamer** (1987) studied Medicine at the University of Groningen. She did her doctoral research at the Developmental Neurology department and research institute BCN-BRAIN of the University Medical Center. Hamer is now completing training in Neurology at the Radboud University Medical Center in Nijmegen. She was promoted on November 7, 2016.

## &gt;&gt; CONTINUATION PROMOTIONS

## Neuroanatomical changes in patients with loss of visual function

P H D S T U D E N T

D. Prins

T H E S I S

Neuroanatomical changes in patients with loss of visual function

P R O M O T O R S

Prof.dr. F.W. Cornelissen

Prof.dr. J.M.M. Hooymans

Prof.dr. N.M. Jansonius

F A C U L T Y

Medical Sciences

Eye diseases that cause loss of visual function are associated with changes in the brain.

However, the underlying mechanism of this association is still unclear. Research into this association is important, since the remaining capacity of the brain to conduct and process the input from the eye is believed to be a crucial factor that can affect the success of future vision restoration treatments. Moreover, such research can provide information for a better understanding of the origin of the investigated eye disease.

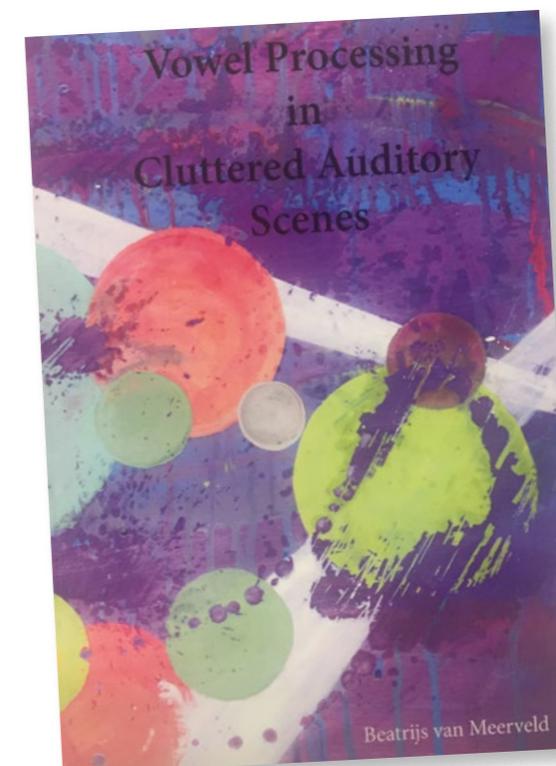
The aim of this thesis was to discover which mechanisms could explain the association between loss of visual function and changes in the brain in general. To investigate this, I studied changes in the brain in various eye diseases that cause visual deprivation. I conclude that changes

in the brain – due to loss of visual input – play an important role in all of the cases. Furthermore, I found evidence suggesting that the eye diseases primary open angle glaucoma and age-related macular degeneration are part of a more general neurodegenerative disorder. This can give directions to future research on the treatment of the eye disease, which might have to expand its focus from treatment of the eye alone towards treatment of both the eye and brain.

**Doety Prins** (1986) studied Medicine at the University of Groningen. She did her doctoral research in the Department of Ophthalmology, where she is in training to be an Ophthalmologist, and the research institute BCN-BRAIN of the University Medical Center Groningen. She was promoted on November 23, 2016.



■ PHOTO BY BARBARA NJORDHEM



## Vowel processing in cluttered auditory scenes

P H D S T U D E N T

B. Valkenier

T H E S I S

Vowel processing in cluttered auditory scenes

P R O M O T O R S

Prof.dr. R.L.B. Schomaker

Prof.dr. D. Baskent

C O P R O M O T O R

Dr. T.C. Andringa

F A C U L T Y

Mathematics and Natural Sciences

Problems with speech processing are associated with the poor representation of speech and a

late use of knowledge to disambiguate the input sounds. The first goal of the current work is to improve acoustical features. We selected the local energetic components from a harmonic complex that correlate to speech articulations. We show that these extractions facilitate noise-robustness. The usefulness for speech recognition could not be explicitly tested with modern ASR techniques because the number of extractions varies which does not fit current systems for ASR.

We assume that humans, in contrast to ASR techniques, are able to process a variable number of input features. Therefore, we investigated, as a second goal, the effect of knowledge and expectation on human perception of vowels. The research paradigm

## >> CONTINUATION PROMOTIONS

where speech in noise can be seen as speech with additional, irrelevant features provides new ways to understand and model speech processing. We performed two perceptual experiments. In two experiments we presented manipulated Dutch spoken vowels. We conclude that the human perceptual system can flexibly handle the varying number of extractions. Knowledge of sounds in a language leads to integration of part of the features that together form a coherent percept.

The research of **Bea Valkenier** (1979) took place in the Department of Artificial Intelligence of the research institute ALICE. It was financed by STW. She was promoted on November 25, 2016.

### **Pleasure from Food: Different perspectives on aging**

PHD STUDENT

H.R. Hoogeveen

THESIS

Pleasure from Food: Different perspectives on aging

PROMOTORS

Prof.dr. M.M. Lorist

Prof.dr. G.J. ter Horst

Prof.dr. A.K.L. Reyners

COPROMOTOR

Dr. R.J. Renken

FACULTY

Medical Sciences

There is increasing awareness that dietary intake is an important factor in the process of aging. An important determinant of dietary intake is the



■ PHOTO BY SANDER MARTENS

pleasure we experience in response to visual or oral presentation of food products. Individuals are aware of which foods they like and dislike. However, they remain unaware of bodily (e.g., hunger) and psychological (e.g., emotions and memory) processes that determine whether they like or dislike a food product. Although manipulations of characteristics of food product have been related to aging (e.g., the relation between vitamin B and memory), processes that underlie the pleasure we experience in response to visual or oral presentation of food products in young and older adults remain elusive. The study of these processes is described in this thesis titled 'Pleasure from Food'.

The results presented in this thesis show that taste sensation (the perception of taste intensity) is similar between young and older adults. The effect of age on pleasure experienced in response to tastes seems to result from changes in the complex interaction between taste sensation, emotions and information stored in memory. To understand the relation between taste sensation and adequate dietary intake with respect to aging, more insight into changes in processes that underlie whether a food product is liked or disliked, such as emotion and memory, is crucial.

**Heleen Hoogeveen** (1989,Balk) studied Neuropsychology at the University of Groningen. She did her doctoral research at the Neuro Imaging Centre of the Department of Neuroscience at the University Medical Center Groningen and University of Groningen. The project was part of the research institute BCN. The research was financed by the Top Institute Food and Nutrition. The project was completed in cooperation with the University of Wageningen, Friesland Campina and Nutricia. Hoogeveen would like to work as a researcher in the field at the intersection between science and the food industry, for the promotion of healthy ageing. She was promoted on November 30, 2016.

### **Growing up and growing old: a longitudinal study on aging in zebra finches: A longitudinal study on aging in zebra finches**

PHD STUDENT

M. Briga

THESIS

Growing up and growing old: a longitudinal study on aging in zebra finches: A longitudinal study on aging in zebra finches

PROMOTOR

Prof.dr. S. Verhulst

FACULTY

Mathematics and Natural Sciences

Michael Briga found no evidence that growing up in harsh environments better prepared individuals to face foraging costs during adulthood.

## &gt;&gt; CONTINUATION PROMOTIONS

Environmental conditions during development can affect adult lifespan. It is often assumed that growing up in harsh environments shortens lifespan, but there is also the alternative hypothesis that individuals from harsh environments can better cope with similar challenges as adult. This has rarely been investigated experimentally in a vertebrate. Here, Briga subjected zebra finches to a foraging cost manipulation during development (brood size) and in adulthood (flight costs) in a 2x2 design. He found that individuals that had faced harsh environmental conditions during development lived shorter, but only when facing a harsh environment during adulthood. Changes in lifespan are often assumed to be associated with changes in aging, i.e. the decline in organismal functioning with age. However, the validity of this assumption however remains to be shown. Here Briga monitored the aging of various traits associated with metabolism and 'state' (mass and bill coloration, a sexual signal indicating 'quality'). He found that traits differed in pace and shape of aging with some aging only in the last year of life (e.g. bill coloration), while others declined gradually throughout adulthood (e.g. metabolism). The harsh environments accelerated the aging of some traits (mass, bill coloration), but not all (metabolism). This shows that aging within an organism is an asynchronous process. Factors affecting lifespan do not necessarily alter aging. Hence lifespan and aging are uncoupled.

**Michael Briga** carried out his research within the Behavioural Biology department of the CBN at the University of Groningen. Next he will work as postdoc at the University of Turku. He was promoted on December 1, 2016.

### The second sex: Functions and mechanisms of sperm manipulation in female *Drosophila melanogaster*

P H D S T U D E N T

M.E. Laturney

T H E S I S

The second sex: Functions and mechanisms of sperm manipulation in female *Drosophila melanogaster*

P R O M O T O R

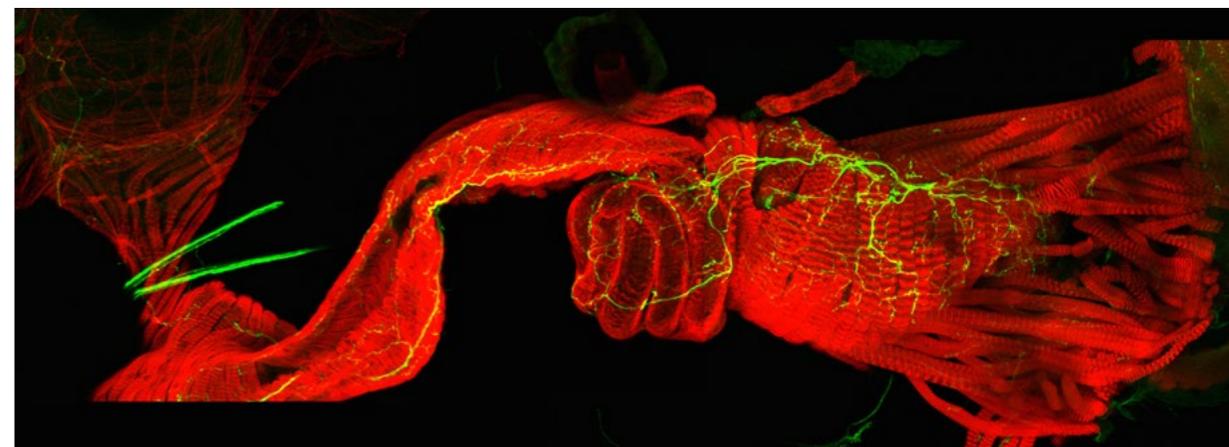
Prof.dr. J.C. Billeter

F A C U L T Y

Mathematics and Natural Sciences

Meghan Laturney concludes that fruit fly females' active control over reproduction extends past pre-copulatory mate choice to include an influence on whose sperm fertilizes her eggs to produce offspring.

Offspring production commences with mate-choice and culminates in the generation of genetically similar individuals. Males and females play distinct roles in this process: males compete to gain access to females, and females exhibit choice. When a female mates more than once, these pre-copulatory interactions extend to the female reproductive tract as sperm from multiple males compete to fertilize her eggs. To investigate the possibility that females bias sperm use after copulation, Laturney employed the fruit fly, *Drosophila melanogaster*. By reviewing the literature, she found that our understanding of female post-copulatory behaviours is relatively limited and set out to investigate the mechanisms and functions of two female post-copulatory behaviours:



■ PHOTO BY JEAN CHRISTOPHE BILLETER

sperm storage (movement of sperm into storage organs) and sperm ejection (removal of ejaculate). She found that females alter their attractiveness and chances of remating via ejection of sperm and anti-aphrodisiac pheromones. Laturney also found that females who remate in quick succession produce different patterns of paternity compared to females with slower remating rates indicating an influence of the female on whose sperm is used to fertilize her eggs. To explore how this choice occurs, she artificially modified the activity of various populations of neurons and determined that sperm storage and ejection are regulated by neuronal circuits in the female central nervous system.

**Meghan Laturney** completed her research in the Department of Behavioural Biology of the institute CBN at the University of Groningen. It was financed by NOW and KNAW. She will continue her career as postdoc at the University of California, Berkeley. She was promoted on December 8, 2016.

### Stimulants and the developing brain

P H D S T U D E N T

L.J.S. Schveren

T H E S I S

Stimulants and the developing brain

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. C. Hartman

F A C U L T Y

Medical Sciences

ADHD medication has no damaging long-term effect on the way young children's brains develop. In addition, the behaviour of children who take medication for ADHD develops in the same way as that of children with ADHD who do not take medication. These are the results of research carried out by brain researcher Lizanne Schveren of the University Medical Center Groningen.

ADHD (attention deficit/hyperactivity disorder) is a common developmental disorder,

## &gt;&gt; CONTINUATION PROMOTIONS



■ PHOTO BY KARLIJN SCHWEREN

characterized by concentration problems, impulsive behaviour and hyperactivity. ADHD is often diagnosed during childhood and the problems continue into adolescence and adulthood. The exact cause of ADHD has not yet been discovered. It is probably the result of several different factors, including genetic and environmental factors, each of which affects the development and progress of the disorder. ADHD is commonly linked to changes in the dopamine system. Studies also show subtle abnormalities in certain areas of the brain or brain systems of people with ADHD.

**Lizanne Schweren** (Geldrop, 1986) studied Psychology at Radboud University Nijmegen and Neuroscience at VU University Amsterdam. She conducted her research, which was partly

funded by the Netherlands Organisation for Health Research and Development (ZonMW), at the BCN-BRAIN research institute of the UMCG in Groningen. She is currently working as a post-doctoral researcher at the University of Cambridge. She was promoted on December 14, 2016.

### **Improving outcomes in pediatric endoscopic third ventriculostomy through outcome analysis and surgeon training**

P H D S T U D E N T

G.E. Breimer

T H E S I S

Improving outcomes in pediatric endoscopic

third ventriculostomy through outcome analysis and surgeon training

P R O M O T O R S

Prof.dr. E.W. Hoving

Prof.dr. J.M. Drake

F A C U L T Y

Medical Sciences

One of the treatment options of hydrocephalus is using an endoscope to puncture the floor of the third ventricle in the brain. This procedure is called an endoscopic third ventriculostomy (ETV). It is an effective but technically demanding procedure with significant risks. It is important to select the right patient for this procedure and that the surgeon masters the technique. The focus of this thesis is on these two issues.

For patient selection, we tested a score system to predict chances of ETV success, the ETV success score (ETVSS). A patient with a high score is a good candidate. We analyzed the predictive accuracy of the ETVSS in a Dutch cohort and found that the score predicts success reliably. However, some patients develop recurrent symptoms of hydrocephalus for which additional treatment is needed. We found that for these patients, again, the ETVSS accurately predicts the chance of success.

The endoscopic technique requires different hand-eye coordination skills than open procedures and mastering ETV requires training. A pilot needs to train for extended periods in a flight-simulator before getting responsibility over an airplane. Why is this not the same for a surgeon? To facilitate this and to create a risk-free training environment, we used



■ PHOTO BY GERBEN BREIMER

3d-printtechnology to create a silicon replica of a brain. We also developed a standardized assessment instrument to evaluate the surgeons' skills and techniques. Maybe in the future, neurosurgeons will be required to score well on such an assessment instrument before getting the responsibility over an actual patient.

**Gerben Breimer** (1988) studied Medicine at the University of Groningen. He did his doctoral research within the research institute BCN-BRAIN of the University Medical Center Groningen. Now Breimer is in training to become a Clinical Pathologist at the Academic Medical Center in Amsterdam. He was promoted on January 11, 2017.

## &gt;&gt; CONTINUATION PROMOTIONS

## The pitch hunt: The role of vocal characteristics in top-down repair of interrupted speech

P H D S T U D E N T

J.N. Clarke

T H E S I S

The pitch hunt: The role of vocal characteristics in top-down repair of interrupted speech

P R O M O T O R

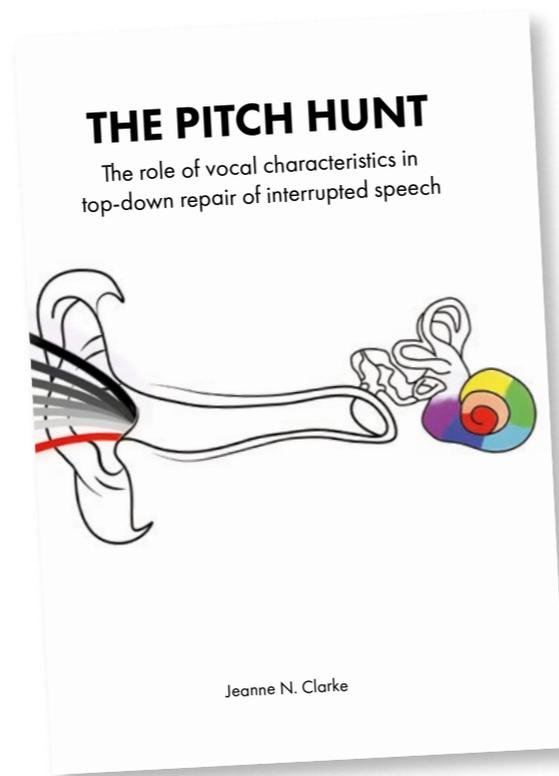
Prof.dr. D. Baskent

F A C U L T Y

Medical Sciences

Understanding speech from a single talker is effortless for a normal hearing person in a quiet surrounding. It becomes more challenging when the talker is surrounded by a loud crowd or other kinds of noise. Individuals with hearing impairment might already experience problems in understanding speech in quiet, and it may become even more challenging in noisy surroundings.

In this dissertation, I investigated how characteristics of the voice of a talker contribute to understanding speech in difficult listening situations. For this, I presented sentences, which were either interrupted with silent gaps, or with noise filling in the gaps, making speech perception more challenging. I further manipulated the vocal characteristics of these sentences, allowing me to test for effects of vocal characteristic manipulation in challenging listening scenarios. The participants had to employ cognitive strategies to perceptually restore the parts of the sentences that were replaced with either silence or noise. I found



that interrupted speech can be successfully restored even for some voice manipulations, when linguistic context prevails over these manipulations.

The results help to establish the importance of pitch for interrupted-speech perception as well as for triggering the cognitive restoration mechanisms, especially when the input sounds are degraded, as in hearing-impairment. However, interestingly, speech perception improvement that was expected to occur with access to pitch cues was not captured at the group level for actual hearing-impaired individuals, although they perceived better sound quality. These findings contribute to assessing how to improve speech perception in noise for hearing-impaired individuals.

**Jeanne Clarke** (1984) received her master's degree in Cognitive Sciences at the University of Grenoble (France). She did her doctoral research in the Department of Otorhinolaryngology and research institute BCN-BRAIN of the University Medical Center Groningen. The research was financed by NWO, a Rosalind Franklin Fellowship and the 'Stichting Het Heinsius Houbolt Fonds'. Clarke now works as a researcher at the Centre National de la Recherche Scientifique (CNRS) in France. She was promoted on January 16, 2017.

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

## > CHEEKY PROPOSITIONS

"The KISS (keep it simple, stupid) principle applies to measuring listening effort as well: the simpler methods appear to work just as well."

> Carina Pals

"Progress is made by trial and failure; the failures are generally a hundred times more numerous than the successes; yet they are usually left unchronicled." - William Ramsay

> Carina Pals

"Imagination is more important than knowledge." - Albert Einstein

> Carina Pals

"Doe mij maar een diagnose die binnen mijn zorgverzekering past" - Loesje

> Catharina Fuller

"Der Teufel, versteckt sich, in den Einzelheiten." - Anonymous

> Marco Artico

"You have to learn the rules of the game. And then you have to play better than anyone else." - Albert Einstein

> Marco Artico

"Develop success from failures. Discouragement and failure are two of the surest stepping stones to success." - Dale Carnegie

> Marco Artico

"Many researchers are convinced to be great scientists, but self-evaluations may be dangerous. It would be better to think every day that anyone is really a honest and modest worker who has the possibility to teach and to learn something along his own academic pathway."

> Marco Artico

"Knowledge is never used up. It increases by diffusion and grows by dispersion." - D.J. Boorstin

> Hildebrand Dijkstra

"Exercise is brain food." - Ploughman 2008, Developmental Neurorehabilitation

> Elisa Hamer

"Choose your parents wisely." -

> Elisa Hamer

"De waarheid is slechts dat wat het beste beargumenteerd is."

> Doety Prins

"An understanding person needs only half a word." About which Deniz Baskent asked: "Can you tell me - which half of the word?"

> Bea Valkenier

"Een PhD traject is vergelijkbaar met mountainbiken: om in de flow te blijven laat je de remmen los, maar blijf je het stuur vasthouden."

> Heleen Hoogeveen

"Both clinicians and journalists show striking signs of resistance when scientific results do not confirm their personal assumptions or sentiments of the general public, respectively."

> Lizanne Schweren

"You can't cross the sea merely by standing and staring at the water." - Rabindranath Tagore

> Gerben Breimer

"Pitches get stuff done." - adapted from Tina Fey

> Jeanne Clarke

## > COLOPHON

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