There is no truth, only perception. - Gustave Flaubert
A quick guide to grants

“You will need to regularly get grants if you want an academic career”, according to Tineke Oldehinkel, Professor of epidemiology of mental disorders. In three steps, she explains how grants work.

Do you remember how it felt to receive your first grant?
“It was fantastic. My first one was a VIDI grant, which also really helped me to establish my name. People often think ‘you received a VIDI grant, so you must be good then’.”

Step 1. Applying for a grant

Let us start with the basics: how do you apply for a grant?
“Normally, you would apply to a so-called call. This is a request to send in applications for specific subjects. Researchers who have been in the field for a while know how these work, and keep an eye on the calls within their areas. They know what will come up next, what to look out for, and possibly have an influence on the calls. Also, the amount of money you can apply for will differ per call. Some are specifically designed for one PhD student, whereas others are much bigger, like European calls aimed at international collaboration.”

How do you go about writing a grant application? Will you go walking for inspiration, or brainstorming with colleagues?
“Recently I applied for a large European grant. To gain time to write that proposal, I worked at home more often than usual, and reduced the number of meetings, presentations and lectures as much as possible. I spent my days struggling, thinking, reading, writing. I researched and looked into many things, both in terms of ideas and feasibility.”

What happens after you submitted a grant?
“The applications are often considered by a committee that determines which calls will or will not be accepted. Sometimes the committee immediately shortlists candidates. With other calls, the applications are sent out to reviewers who evaluate the application, which will guide the committee in their decision.”

What are the odds of getting a grant?
“Usually low, 10% at most. It can be significantly lower as well. Many people complain nowadays that the chance
of being rejected is much higher than acceptance. And that well-paid researchers need to spend so much time writing applications. It really is a waste of time and effort.”

Isn’t it depressing to get rejected after putting in so much effort?
“Every researcher will be grumpy for a few days after hearing they have been rejected when they had invested a lot of time in the application. It is something you will need to cope with, it is part of the job. And of course, not every grant proposal takes an awful lot of time, there are also more compact applications that you may write within a couple of days. Besides, writing an application is a good way to sharpen your thoughts. Often you will start with some vague ideas, and writing them down urges you to become much more precise. So rejected applications are not a total waste of money. Afterwards you can try different ways to carry at least part of it forward.”

How do you justify your expenses? Will you send them your receipts?
“In principle, everything has to be justified, but they will not look at every receipt. Your expenses should match your budget of course. Also, there is an accountant involved who will approve all the payments. This takes up a lot of time, and may not be the funnest part. But I do find it reasonable, because it is public money and you should be accountable for it.”

What happens if you need more money than you asked for?
“Then you budgeted incorrectly, and that is your own problem which you will need to solve yourself. I would almost say that it is a mean game: due to the competition it can be tempting to promise a lot for a modest amount. So when your plan is approved, you might struggle to deliver what you have promised.”

What do you miss when a big project finishes?
“What I do miss when a project ends is having the budget to focus primarily on doing research, which I really enjoy. After I had received a VICI grant, I barely felt any pressure to look for additional funding. Nowadays, this pressure is growing again, even though I still have lots of other things to do, and that is rather time-consuming. But a project never really ends. It will end financially and formally, but always be the prelude to something new.”

Step 2. Getting a grant

When you get a grant, will you receive the money all at once or in instalments?
“You will receive the money based on a carefully drawn-out budget and the payment schedule will differ according to each grant. Sometimes you will receive the money annually, but with other grants you will get it in a one-off payment. With bigger projects, the second half of the payment might be contingent on an evaluation of the project’s progress. Usually, you will have to justify everything you did.

Step 3. After a grant

What happens to the lab when the grant comes to an end?
“A project never stands entirely on its own. For instance, our research group was among the first to conduct diary studies, and when we started doing so this was new and very little research had been done in this area. So we were pioneering methodologically on how to use them in a clever way. Based on our publications, people within and outside of our group have been able to build on our experiences and take it further in various ways.”

About Tineke Oldehinkel
Tineke Oldehinkel is Professor of life-course epidemiology of common mental disorders at the University Medical Centre Groningen. “I would describe myself as a researcher who is interested in the emergence and course of depression and other affective disorders.” As principal investigator or TRAILS (Tracking Adolescents’ Individual Lives Survey), she studies the mental health and development of adolescents and young adults. In addition, Oldehinkel is director of the research program ICPE (Interdisciplinary Centre Psychopathology and Emotion regulation), which focuses on psychobiological mechanisms associated with the onset and course of affective problems, and Joint Editor of the Journal of Child Psychology and Psychiatry.
From the boardroom

As of December 2019, Elkan Akyürek from the Department of Experimental Psychology has succeeded Ben Maassen as chair of the BCN board.

BCN’s academic director, Robert Schoevers, has returned from a stay of several months in Australia and will resume his duties.

On 28 January 2020, the BCN board had a productive meeting with the Think Tank, represented by Raoul Bongers and Barry de Groot. Several topics were raised. To begin with, the Think Tank thinks that it would be a good idea to present more information in the BCN Newsletter about the issues discussed in the monthly board meetings. The BCN community at large would surely benefit from knowing more about the extension of the U5 network and would certainly also be interested in the discussions about the implementation of the proposals made by the so-called Committee Van Rijn. In this way, BCN members will be in a better position to present ideas to the board. It was decided that Frans Zwarts will write an article about the Van Rijn report for the BCN Newsletter in such a way that BCN members will be able to respond and contribute to the policy discussions within the board.

Another topic that is highly relevant to BCN is Artificial Intelligence. The national government has decided that it will stimulate this field of research the coming years because of its strategic and competitive importance to the Netherlands. BCN member Niels Taatgen from the Department of Artificial Intelligence has been asked to consult relevant scientists and outline a university-wide initiative in this field of research.

The Think Tank has not noticed any board initiatives in the area of funding. There have been no suggestions for creating a joint platform for writing and improving grant proposals. The board agreed that it is not happy with the overall results of
grant proposals that have been submitted, but that BCN as an organisation is not big enough to organise a separate platform for proposal writing. We must rely on existing funding officers instead. In June 2020, there will be another BCN PI meeting, which might create new forms of collaboration between BCN members and new ideas for grant proposals, as has happened in the past. The BCN Master programme is relatively successful in acquiring PhD positions. The same can be said of the grant activities within the U5 research network ‘Ageing Brain’. BCN members are successful in acquiring personal grants (Veni, Vidi, Vici), Rosalind Franklin Fellow Merel Keijzer from the Department of English being a recent example with her Vidi project Language Learning Never Gets Old: Foreign Language Learning as a Tool to Promote Healthy Aging. Likewise, Frans Cornelissen from the Department of Ophthalmology was awarded an ITN grant. Communication of these successes remains an important agenda item.

The Think Tank has noticed that BCN organises relatively large thematic events, but that the selected themes are not necessarily interesting to every BCN member. The Think Tank wonders if it would be possible to organise smaller events for smaller groups of members as well. As an example, the creation of a BCN science café is mentioned.

The Think Tank appreciates the regular mail BCN Agenda & News but thinks that it is not ‘user friendly’. The suggestion is to replace it with a Google agenda to which members can subscribe.

Another suggestion is to invite scientists who happen to visit the Netherlands. A typical example are Heineken Prize laureates that work in the field of neurosciences. To continue its existence as a (national) research school, BCN should be reaccredited in 2021. Contrary to what we thought, however, the procedure cannot be part of the evaluation 2015-2020 of the University Medical Centre Groningen. The board will have to propose a Peer Review Committee (PRC) and formulate guidelines which are based on the Standard Evaluation Protocol 2015-2021 (SEP) and the Groningen Research Assessment Protocol (GRAP). The evaluation process should be ‘light’, complementary to, and not a repetition of, regular SEP evaluation of the participating units including, where applicable, the Groningen Graduate School. The Think Tank has offered to help us. One of the suggestions is to let the PRC talk with a group of BCN members or the Think Tank itself as part of the evaluation.

The annual BCN Retreat will take place on 26-27 March 2020 in Odoorn.

On 1 July 2019, the total number of PhD students was 286 (Medical Sciences 173, Science and Engineering 44, Behavioural and Social Sciences 40, Arts 27, Campus Fryslân 2).

■ FRANS ZWARTS
■ PHOTO BY ELMER SPAARGAREN
Understanding the way in which neurons interact with each other in order to exchange information is crucial for explaining all activities happening in the brain, from perception to consciousness. While conventional electrophysiological methods have been extremely helpful in this process, they have significant drawbacks, such as being able to record only from a limited number of neurons or inability to access tissues deeper in the brain. A novel method of investigating these neuronal communications, both in vitro and in vivo, is through genetically encoded optical indicators of neuronal activation. The basic premise is fairly straightforward—using a fluorescent sensor, changes in voltage can be visualized as varying levels of light, so that when there is a change in membrane potential, the indicator (a specially designed protein) “lights up” in response to light from a microscope and by following and quantifying these changes in luminescence, it’s possible to directly examine patterns of neuronal activity. Moreover, these special proteins can be genetically inserted into chosen neurons, making it an accurate and high-resolution system. The newest developments promise to overcome the biggest challenges in the field and allow for creating true “live-action” visualization of interneuronal communication.

Attempts at creating a way to optically imagine membrane potentials have been around for a while. Initially, an indirect way of measuring electrical activity in neuronal networks has been designed, namely genetically encoded calcium indicators (GECIs). Since induction of action potentials (AP) is a result of changes in ion concentrations, including calcium, special proteins were designed which changed their fluorescence levels depending on how much calcium they sensed. This system allows to optically follow APs of specific, genetically mutated neurons which express this protein, in awake and behaving animals. However, this is still just a proxy measure for neuronal activity, since it doesn’t actually detect membrane potential, just ion concentration. This also means that it has a much slower reaction time than the scale of membrane potentials and can only detect supra-threshold changes (i.e. those leading to an AP). Therefore, a way to directly imagine voltage fluctuations was introduced – genetically encoded fluorescent voltage indicator proteins (GEVIs), which analogically to GECIs can alter their fluorescent emission, however they do so based directly on membrane depolarization levels. This technology highlights Genetically-encoded voltage indicators: one step closer to real-time mapping of electric activation in the brain.
can allow for non-invasive, high-speed recording of electrical events with cellular resolution, even in deeply located neurons. Moreover, being directly influenced by voltage changes, it can detect both spiking and non-spiking electrical activity: subthreshold events, as well as transient activated states and hyperpolarizations. It can also be applied to multiple locations in parallel and has superior temporal resolutions when compared to GECIs.

Such high-resolution measurements allow for a better outlook on neuronal populations and synaptic activity in the brain, however they still battle with multiple difficulties. Most hurdles stem from the extreme thinness of the membrane, to which potentials are restricted. This requires extremely precise targeting, and it also restricts the number of reporter molecules which can be inserted. Smaller number of fluorescent indicators mean less light produced in response to electrical changes, which makes it harder to track the signal. Additionally, it’s not possible to simply increase the light intensity, since that would also result in increased photobleaching of the proteins and increases production of leftover molecules which can be damaging to the membrane structure. Further difficulties arise when moving from in vitro imagining and in vivo transparent samples (e.g. C. Elegans) to light-scattering deep tissue imagining in non-transparent organisms (such as mammals). Therefore, an ideal GEVI should have large, easily detectable voltage-dependent changes in fluorescence, as well as sub-millisecond response kinetics to be able to follow extremely quick changes in membrane potential. Furthermore, the imagining part of the processes also needs developments to be able to deal with high speed of voltage events and thinness of the membrane. To this end, multiphoton voltage imagining has a lot of useful characteristics, such as long wavelengths, which are less damaging to the tissues and are able to penetrate it more deeply.

The newest developments resulting from a collaboration between groups from Stanford University and the Ecole Normale Superieure in Paris (Vilette et al., 2019) promise to solve many of the outstanding issues in membrane voltage recording. The new GEVI belongs to the ASAP family – ASAP3 (accelerated sensor of action potentials 3), and is highly responsive to multiphoton excitation (meaning you can use multiphoton microscopy to illuminate and record from the protein). It also shows sub-millisecond response kinetics allowing for accurate AP timing, efficient membrane localization, and single-cell resolution. Crucially, ASAP3 has now been shown to work in vivo even across several days, in experimental paradigms presenting locomotion modulation of oscillations in hippocampal neurons, as well as of firing rate in primary visual cortex in mice. Apart from engineering ASAP3, in their recent paper Villette and colleagues also introduced an improved multiphoton volume excitation method, namely ultrafast local volume excitation (ULoVE), which collects photons from a larger membrane area, expanding the illuminated volume (i.e. acquired signals per time point). Additionally, ULoVE decreases contrast and resolution loss due to tissue scattering, and has a fast sampling rate, allowing for improved stability and better suppression of background fluorescence. Combining ASAP3 with ULoVE allows for not only visualising, but also recording very fast voltage modulations in vivo, both APs and subthreshold ones, and observe in real time how the nervous system works and communicates.

Lastly, as always in science, there is still room for improvement, such as further increasing the performance under multiphoton excitation, and designing brighter GEVIs with higher signal-to-noise ratio, which wouldn’t be as susceptible to quick photobleaching and would allow for long-term signal monitoring. Due to the pace of development in the field, more collaboration and integration would be beneficial, both in terms of techniques, but also nomenclature for the newly developed GEVIs. Also, increased collaboration would allow for investigating other microscope methods which could be better equipped to deal with low photon availability and extremely fast membrane potential signalling. It is also important to note that it’s highly unlikely that a one-fits-all model will be applicable to GEVI technology, and they will rather require tailoring to specific experiments and contexts. Ultimately, being able to obtain simultaneous electrical recordings of input-output activity patterns at single-cell resolution from all neurons from a given circuit would allow for decoding of information processing and massively increase our understanding of brain circuitries.

■ BY ALEKSANDRA CYWINSKA
■ PHOTO BY SANDER MARTENS

Reference
Vilette et al., 2019, Cell 179, 1590–1608 December 12, 2019 a 2019 Elsevier Inc.
Bits and pieces column

Three-minute breathing pause for academia

After dry January comes flooded February, at least, when you ask my nose. I have a cold and breathing through my nose is not easy. There goes my opportunity to practice the three-minute breathing pause, as instructed on a printout I found in our canteen. The printout entered our department following a workshop one of our PhD students organized during which we were taught the basics of taking breathing pauses. It was really nice. The attendance rate was remarkably high.

The interest for learning to deal with stress wasn’t a surprise though. You can’t have missed the reports on the high proportion of academics who experience stress-related psychological and physical complaints. Also in our graduate school, this topic is high on the agenda. Recently, all PhD-students and PhD-supervisors were invited to (separate) sessions to discuss PhD-stress (experienced in severe levels by 40% of the PhD-students!) and the role of the supervision therein. I think it’s great that this topic is taken seriously by our faculties and graduate schools.

Of course, I now remember my own PhD, defended in 2011, as a fun time in which I learned an incredible number of things, had the freedom to learn what I wanted, and made friends for life. But I will not only give you hallelujah ‘survivor biased’ memoires. I vividly also remember experiencing my PhD as a millstone around my neck. It felt as if there was no way out and I regularly felt stressed, mostly caused by the conviction that I was not good enough. Maybe taking a mindfulness course would have helped me, but I think a substantial part of the PhD stress is caused by unclear and erroneous expectations. I realized I had a few erroneous assumptions (sometimes almost silly ones) during and after my PhD. Becoming aware of those assumptions helped me stay motivated and sane. In case you don’t find tips super annoying, keep reading.

1) I felt a huge ‘duh-erlebnis’ when I found out that also my PhD-supervisors didn’t know what my thesis would
look like in the end (and the silly part: what would come out of my studies). This realization meant I didn’t have to perform towards a delusional endpoint that was clear to everyone but me, and this made me much more relaxed. Even if you don’t attribute super-human powers to your supervisors, it might help to realize that creating your thesis is a journey you take together and is as exciting for your supervisor as it is for you. And, even with a clear experiment- and analysis plan, things can go different; that’s fine. The biggest challenge of a PhD may actually consist of dealing with the fact that things go differently. Try to applaud yourself for being flexible enough to keep seeing value in all the work you do, although at times it may feel as if you need a telescope for that.

2) I found it really difficult during my PhD that I was not able to judge how I was actually doing. No marks, no points (I was not in a graduate school). I could only compare myself to others and was arrogant enough in my insecurity not to believe my supervisors who said I was doing fine. I knew better, because I compared myself to others. Of course, only to PhD students who were way further in their projects and with completely different backgrounds and skills that I could only dream of. This clearly didn’t work, but it was something that was not easy to unlearn as I was brought up always comparing myself to others and saw someone else’s success as my failure (yes, the fixed mind-set). I now see that skill sets are hardly comparable, and more importantly, that projects are almost never comparable. I truly believe that science only works if people with complementary skills collaborate, so variation in skills is needed. I (still) try not to compare myself to others. I learned to persist and to suppress the urge to withdraw when I think I’m not the best person for the job. So my advice for comparing yourself to others: STOP DOING IT, compare yourself to your previous you, and believe your supervisors 😊.

3) What I would have loved to have understood way earlier is that my thesis is a ‘proof of competence’ (in Dutch: proeve van bekwaamheid), meaning my thesis was nothing more than a proof of the fact that I would be fit to work relatively independent as a scientist. This was the goal, not the starting point. For me framing the PhD as a learning path, and not as a test, was a crucial realization enabling me to enjoy it much more. Also, this made me appreciate and use the endless possibilities the PhD provided me to learn what I wanted from whomever I wanted. Indeed, I slowly learned to adapt a growth mind-set. My number-two advice is (below you find my ultimate top-1 tip 😊) to focus on what you want to learn in order to contribute to the science of your liking and society at large, either within or outside academia. In other words, focus on what you want to learn, not what you want to achieve. This helps me to stay motivated and to feel less stressed. Connecting to colleagues who behave in ways that match how I want to be as a scientist also helps. In hard times, I try to focus on the things I like about academia. In good times, I try to enjoy the same things as much as I can.

I truly appreciate initiatives such as providing mindfulness training to deal with stress. But what would really help me, I think, is when the idea of the three-minute breathing pause could be translated into an academic equivalent. That’s my biggest wish for academia, regular breathing pauses, where we all have time to reflect, think, and get inspired. A shorter academic year, regular sabbaticals, or any other pauses. Pauses I used to implement on a regular basis form my ultimate survivor top-1 tip: Designate your own Friday’s for Future. Play, learn, reflect, read, discuss, organise. Preferably with your favourite colleagues. Do whatever you like to do as long as it is in line with your academic values (including striking for the planet) and learning objectives. I think that creating such breathing space will make us all less stressed, happier, and better academic citizens. At least, it helped me to keep having fun during my PhD, and realize that despite the stressful elements, working as an academic scientist still is the best job I can imagine. As I might still suffer from survivor bias, comments are welcome: m.j.van.tol@umcg.nl

Marie-José works as an assistant professor at the Cognitive Neuroscience Center and studies neurocognitive factors underpinning vulnerability for mood disorders.

■ BY MARIE-JOSÉ VAN TOL
■ PHOTOS BY SANDER MARTENS
Science at the Lowlands festival:
Science at the Lowlands festival: freshly-made... languages!

Last year, RUG researcher Gregory Mills brought his experiments about language communication to the Lowlands festival. He talks about what makes a language, what a comprehensive theory of communication would need to account for, and the dance behind dialogue.

The rationale

During my doctoral research my supervisor encouraged me to read Wittgenstein, which dramatically changed how I thought about language: Up till then I thought that the meanings of the words I was using in everyday life and in my studies were essentially an expression of my own individual thoughts. I hadn’t realized that the only reason anyone is able to use words at all is that we learn them from other people. But how do we learn language from other people? I became interested in the mechanisms that underlie this process: how we signal that we do or don’t understand each other, how we take turns communicating, and how these interactive processes affect the meaning of the words that we learn. Since I studied computer science in my bachelor’s and then changed to psychology and philosophy, I wonder if these language-related mechanisms could be used to create more naturalistic human-computer interaction.

Although the primary use of language is in interactive settings, such as gossiping with friends or participating in a shared activity together, historically most cognitive research has investigated language in non-interactive settings. Typical psycholinguistic experiments might present participants with texts, sounds and images, and analyze how they are processed by individual participants. Relatively recently cognitive researchers started using experimental paradigms that investigate interactive language use in groups of participants. In my opinion, the most important finding from this line of research is that when people interact, they adapt their use of language to that of their partner – the meanings of the words they use, their pronunciation, their use of syntactic structures, as well as their coordination of turn-taking. Even more recently, drawing inspiration from Wittgenstein’s idea of language games, researchers have started using experimental designs which require participants to communicate to perform a collaborative task, but the participants are prevented from using natural language – imagine putting a piece of Ikea furniture together with someone, but without using language! What happens in these experiments is rather...
remarkable: Rapidly, within about twenty minutes or so, participants create their own, new communication system from scratch. This occurs across modalities, for example using novel gestures, sounds, drawings, or other behavior to refer to objects, concepts and actions within the nascent language game. As the participants interact with each other, and adapt to each other’s interactive behavior, their communication system becomes more and more expressive and systematized. The processes underlying this emergence of communication systems are still very poorly understood. On the one hand, a common observation is that people’s communicative behavior often converges – people pronounce words more similarly and develop a shared vocabulary. Yet on the other hand, as people adapt to each other, their behaviour often diverges, becoming more complementary as they develop different, interlocking roles in the interaction. It is still really unclear how the pressures of divergence and convergence operate both within- and between- different levels of linguistic processing. Up till now, most of my research has focused on the relationship between the semantic level and turn-taking, and I was looking for a way to investigate processes of convergence/divergence at other levels.

Quite fortuitously, the Lowlands experiment emerged as a very enjoyable collaboration with my colleague Martijn Wieling, who is an expert on articulation in language. He was interested in looking at how articulation might be modulated in interactive settings, so our interests dovetailed very nicely.

**The language game experiment**

The experiment we carried out is inspired by collaborative computer games such as guitar hero or rockband. In these games, pairs of players see a sequence of notes that they have to play together on separate instruments. However, in the Lowlands experiment there are a few differences: Instead of playing sequences of musical notes, participants must say "nonsense" consonant-vowel pairs: One participant can only say the sounds “ka” and “ki”. The other participant can only say “ka” and “koe”. An automatic speech recognizer (which was programmed by Mark Tiede from Haskins laboratories who also collaborated with us), automatically identifies which sounds the participants say. The other difference is that only one participant sees the instructions. Consequently, the person who has the instructions has to figure out a way of directing the other. And they are only allowed to do this by uttering “ka”, “ki” and “koe”. The participants couldn’t see each other – they communicated via an audio link.

What this game does is create a set of fundamental coordination problems that the participants have to resolve without using natural language. The most basic coordination problem it creates is that for any sound (i.e. “ka”, “koe”, “ki”) it is always ambiguous whether it is actually meant to be communicative or not. For example if the director says “ka” – is it because the task requires the director to say “ka” at that stage in the sequence or is it because the director is trying to get the other participant to copy them and say “ka”? Many, perhaps all communicative behaviours have this property – if someone rapidly closes and then opens their eyes – is it wink or a blink? If someone pushes an object towards you – is that incidental or a request for you to pay attention to the object?

Also because the participants don’t share the same repertoire of sounds, this means that directors have to figure out how to get the other participant to perform an action that they themselves can’t perform, i.e. the participant who can only say “ka” and “ki” has to figure out a way of getting the other person to say “koe” and vice versa. Solving this coordination problem requires the participants to develop communication strategies that go beyond simple copying – they have to establish complementary interlocking behaviours. For me, this is one of the more interesting aspects of this research. Most experimental research on communication presupposes that people who communicate successfully speak the same language, and have effectively identical repertoires. But one of the main reasons we communicate with each other is because we can’t (or don’t want to!) perform certain actions that our interlocutor can.

What was really reassuring is that the participants really got the experiment – most of them repeatedly burst out laughing while playing the game and it was actually really

> They are only allowed to do this by uttering “ka”, “ki” and “koe”.
fun watching them play. The interactional sequences were remarkably reminiscent of babies babbling with each other! Most importantly, we were interested in the nature of the new communication systems participants created. Almost all pairs who played this game created idiosyncratic systems. Perhaps the most interesting signals we observed were those for dealing with miscommunication – in everyday conversation people use repair mechanisms – e.g. when asking for directions, someone might say “huh?” or the person giving directions might correct, e.g. “it’s not called Church street, it’s called Church road”. In this experiment, some of the most skilled pairs developed their own idiosyncratic repair routines in their newly emergent language. Since we were also interested in whether participants’ pronunciation converges after they have worked together on this task, we took ultrasound measures of their tongue positions while they read a couple of sentences both before and after playing the game.

Conducting this experiment at a festival was a rewarding and somewhat challenging experience. The experiment was only made possible by the student assistants who tirelessly recruited participants from the festival, steering them towards our booth, and ran the experiments. The science booth was quite close to the main music stage of the festival. When acts were playing, everything was vibrating. Sometimes we had to shout to explain the game, and up to the first pair of participants who took part I thought we would have to redesign the experiment so that it didn’t rely on voice recognition. Many people took part, some of whom were somewhat drunk. We did, however, measure drunkenness and are wondering what
the effect of alcohol on pronunciation is and whether it helps people better understand each other. It was also very rewarding to see that participants found the experiment enjoyable. Quite a few even asked whether they can download the game to show to their friends. It highlighted aspects of interactional communication that participants themselves found interesting.

**The implications**

What this research is pointing towards is that symbolic language is underpinned by an extremely flexible set of interactive coordination mechanisms. In particular, the various cues we use to coordinate how we take turns with our partners are not static, fixed signals, but instead are rapidly negotiated and conventionalized during dialogue, over 20 minutes or so. Crucially, even within relatively simple tasks such as this experiment, pairs of participants create idiosyncratic conventions. The fact that this experiment worked – in a booth that was shaking, between naïve participants, many of whom had had a drink or three, suggests that the communication systems they developed were fairly robust!

Most of them repeatedly burst out laughing while playing the game and it was actually really fun watching them play.
One area of research where this is of immediate relevance is in the design of conversational agents such as Siri or Alexa. Such tools have very simple interaction protocols baked into their system – they can answer simple questions, or respond to simple requests, e.g. “Alexa. Switch on the lights!” Yet, if we are to build systems that interact naturally with humans, the findings from this experiment suggest that simply trying to hard-code interaction protocols is insufficient. The machines need to be able to interactively co-create new routines with humans, by negotiating flexibly on the meanings of the communicative signals that they use. For example, consider an interactive GPS system. If a user asks “is it far?”, that user might have a different concept of “far” than another user. Similarly, what one user considers a “wide street” might be different from another user. Or if a user instructs the system to “wait a moment” - again, the system should be able to adapt to different users’ conception of “a moment”. Building such systems requires a radically new approach – instead of attempting to collect exhaustive datasets of all possible words and meanings, this requires agents to both create and adapt to novel communicative signals. This necessarily involves the ability to identify and resolve miscommunication. If a system is uncertain, it should ask for clarification, and conversely be able to respond to clarification requests from the user, subsequently adapting its representations to more closely resemble that of the user. In fact, researchers at Google, Facebook and OpenAI are using this approach to design conversational agents.

More generally, this research highlights the central role that miscommunication plays in language use. From an individualistic perspective of language-processing, miscommunication is typically seen as “error”, as ideally something to be avoided. However, in interaction interlocutors will necessarily encounter other interlocutors who have encountered different situations with different partners, and whose language is consequently different from their own, unavoidably giving rise to the potential for miscommunication. What this research suggests is that the conversational “repair” mechanisms identified by conversation analysts play a central role in the emergence of linguistic conventions. In a further set of experiments, for example, we study this by looking at how people give each other route descriptions in a maze task, while experimentally manipulating the feedback they give each other. In these experiments people communicate via instant messaging – all their messages pass through a server which can be used to transform what they think the other person typed. In one experiment I have conducted with Pat Healey at Queen Mary University – the server automatically detects turns that signal some difficulty with understanding, e.g. “did you mean three or four steps?” and replaces them with more severe, amplified signals of misunderstanding such as “huh?” or “what?”. Rather remarkably, we found that amplifying the severity of miscommunication has a beneficial effect on communication: people who saw these modified turns built a more efficient and robust communication system! I have conducted similar work with Gisela Redeker, who is also here in Groningen. We found that amplifying signals of “trouble” in peoples’ turns also seemed to improve the way in which the participants systematized their communication system.

We tend to think of miscommunication as something that should be avoided, but the mechanisms of miscommunication are precisely what keep understanding on track, and underpin the creative aspects of language. Seeing communication unfold, while watching participants interrupt, clarify, repeat and build on each other’s behavior, while developing new behaviours that become progressively imbued with meaning, almost has a musical quality to it. It’s like dancing.

By Valeria Cernei
“Do. Or do not. There is no try.”

- Yoda, Star Wars Episode V: The Empire strikes Back

Questions like “What are you going to do after you graduate?” “Are you considering doing a PhD?” come right at me as a nearly graduated B-tracker. The usual, but burdensome. You don’t know what you’re capable of after a master and after graduation a certain feeling of safety disappears. I’ve never realized this until the end of my master’s degree came near. When I started, I wanted to become a researcher, but the past two years have brought some doubts about it. Am I capable of doing a PhD and if yes, what topic? If I do not want to, will I fail myself? I am scared to the max and I am in the dark. For now, all I really want is to focus on the best parts of my master degree and what I did learn in those past two years.

When I started this master, I did not know what topic exactly interested me. I only knew that I was fascinated by behavior in general and that I wanted to do a PhD. Everything seemed fun and I mainly wanted to learn skills and new facts. However, soon enough the self-doubt kicked in. I was surrounded with enthusiastic fellow students, who gave a full 200% and had high grades. Some of them even knew precisely their career path. They had everything in order, asked the most intelligent questions, and dared to discuss. The bar was set up very high already and I did not even know what I wanted to do for my project.

One thing I knew for sure, I want to work with fruit flies! Why? It is a well-designed model that allows you to study behavior in relation to the genotype. No restrictions such as endless waiting for approval of a committee and endless possibilities. Eventually, I ended up in Wageningen for my first project. Here I did research on a sister species of Drosophila melanogaster, the Drosophila suzukii (Imagine a fruit fly on a motorcycle or in a car. I definitely did!). A pest species that lay their eggs in fresh fruit (cherries, strawberries etc.) rather than in rotten fruit. This really fueled my motivation and enthusiasm as it was about a species I have never heard off! Furthermore,

“This really fueled my motivation and enthusiasm as it was about a species I have never heard off!”
this project showed me the importance of fundamental science as a basis in applied science. Next to this extensive project, I made many new friends and picked up my passion for drawing again. The latter came to my benefits, as I was greatly encouraged to use it to make my own illustrations for my project report. Altogether, a great recipe for a successful project!

For my second project, I wanted to stick to fruit flies and this time there was a slot in Jean-Christophe Billeter’s lab. The project focused on how the female D. melanogaster assesses her post-copulatory environment in context of ejaculate ejection. Unfortunately, it did not go as well as the previous project. I suffered from a fluctuating motivation, not being able to keep an overview and I was distracted by my personal life and career/job opportunities. I did not have the feeling that I could use my creativity. What did I contribute? All of this took a mental toll on me and affected my study results. I was about to give up.

Even though things were hard, I did not give up and the good news is that I finished everything and will graduate soon. This could not be done without the support of my friends, family, but also supervisors. They encouraged me by telling that they loved my enthusiasm, creativity, and that I was not the only one facing these problems. I met with the study advisor and decided to slow down, take part in the study-coaching group, and to see a psychologist. This all gave me the ability to focus on my talents rather than my failures. I was able to express my creativity again with crochet and even taught a friend how to crochet.

However, I promised to tell you what I’ve learned these past two (and a half) years. Well, I’ve learned that my characteristics and talents are not to be compared with others. If I do so, I will not cherish these traits. Instead, I’ll start to doubt myself and every action I make, resulting in less motivation and enthusiasm. You will only be able to give it a try, rather than actually go for it and learn, resulting in a minimal result. For my next adventure, I will take this into account. Especially when I am choosing to do a PhD or other academic related jobs. Do not doubt yourself and just DO IT. On the other hand, in the words of my favorite space goblin “Do. Or do not. There is no try.”

BY HEDWIG DOORBOSCH
DRAWING AND CROCHETING
BY HEDWIG DOORBOSCH
BCN board member column: Interstice

I could have started this column pretending that I set out to write about the interstices that exist between the different research fields within the BCN Research School. But I will not. In the spirit of Open Science, I will instead start off by disclosing that I did not know that “interstice” is an actual word until I came across it on the internet this morning.

What I was going to do, honestly, was to tell you something about how the distances between different research fields can prove challenging for the individual scientist, and how BCN can play an important role in covering some of that distance. I then learned that an interstice represents just such a space in-between things, particularly a very small one. I had been looking for this word without knowing it.

The problem of the interstice is really the packaging, I think. In the great Science Shipping Container, which holds all of our little research fields, inevitably some space is wasted. Think of a box of oranges, if that helps. In the very heart of a given orange, science is straightforwardly concerned with a topical question. So, at the core of experimental psychology, we might study when items in our working memory become fuzzy, and try to understand why that happens. Meanwhile over at the other orange, a molecular neuroscientist might study the intricate mechanisms of the G protein-linked signaling cascade.*

Now, theoretically, it is perfectly fine to pick a research question in-between fields. Indeed one might argue that some of the most interesting questions are found right there, in particular between closely neighboring fields. But even in such an interdisciplinary interstice, you will likely experience a lack of support. Firstly, because there is just less known about questions that are peripheral to any one field, by definition. Secondly, because you have become a kind of turncoat by not doing research that is more central to either of the involved disciplines.

It’s a real thing. In my own niche within cognitive neuroscience I study things like the role of short-term synaptic plasticity in human working memory. I have experienced ‘proper’ neuroscientists express their doubts about the strangely psychological nature of such a research question; as if working memory is some dubious, intangible entity. More mainstream psychologists, in turn, wonder why we should even want to turn our attention to the inner workings of the brain, when actual behavior is all that really matters in the end. Confronted with such misunderstandings, BCN feels like a safe house, where an open mind for interdisciplinary research is the norm.

I am sure most BCN members can relate to my personal experiences in this regard. However, many of our colleagues at the university pursue more
mono-disciplinary research, and they may not always immediately appreciate the virtues of BCN. I think it is important that we show them. The BCN Board is currently drafting a structural proposal to ensure an enduring, financially secure future for our school, which is an effort I fully support. From the BCN community, excellent research is already highlighting the success of our interdisciplinary approach. But perhaps there is more we can do? As the newly-minted chairman of the Board (thanks, Frans!), I would love to hear your ideas on how to take BCN further. Drop me a line at e.g.akyurek@rug.nl. In defense of the interstice!

■ BY ELKAN AKYÜREK
■ IMAGE BY HANS BRAXMEIER FROM PIXABAY

* Again, full disclosure: I got this seemingly important cascade off Wikipedia.
Mindwise: A grandmaster’s mind

Although chess has to compete with all sorts of attention-craving alternatives in the digital era, it is still surprisingly popular nowadays. Social media, streaming platforms, and colorful smartphone games arguably all pose a serious threat to this seemingly antiquated and time-demanding form of amusement. Nevertheless, there seem to be some qualities of chess that maintain some attractiveness in turbulent and garish times. Many people still enjoy its simplicity and plainness, maybe also as an antipode to modern forms of entertainment and diversion. However, it is not only a fun and relaxing way to spend your time, chess also has a rich history with many ties to all kind of cultural developments across the centuries. In the literature research for my master thesis (which was about possible transfer effects of playing chess on brain functions) I discovered that the disciplines of psychology and the game of chess had formed an unusual alliance at the turn of the 20th century. This alliance not only changed the approach to how chess is played fundamentally but also shaped the very first models of the newly emerging school of cognitive psychology and supported its first steps. In the
I will make a brief excursion into the history of chess research and will uncover the astonishing linkage between chess and psychology.

Draws, usually despised in competitive sports, are not at all uncommon in chess (see Karlonline). On grandmaster level, around half of games played result in a draw. Our current world champion of chess is Magnus Carlsen. After a series of draws, Carlsen broke this trend in 2018 and defended his title for the third time with a clear 3-0 victory in the tiebreaks. It was the first time in the 132-years history of the FIDE (Fédération Internationale des Échecs) chess world championship that 12 classical matches in a row had ended in a draw. An old theory by the first ever world chess champion Wilhelm Steinitz (1836–1900), who won the first official world championship in 1886, proposed that given flawless play by both sides in every move, the result of the game should necessarily turn out to be a draw. Looking at the series of draws in the recent world championship matches, one might interpret this as confirming evidence for Steinitz’s theory.

The draw death of chess

The “modern school”, originally developed by Wilhelm Steinitz, promoted slow-paced and solid positional play over the risky manoeuvres of the romantic era. At the turn of the 19th to the 20th century, this movement was gradually replaced by the so-called “modern school” of chess, which was guided by an aggressive style of play. This change and the increased prominence of computer chess, which started in the 1980s, has been a game-changer, as computers are able to calculate the best possible move for a player, even a move a human would not be able to calculate without the help of technology.

A series of draws

In chess, draws are often seen as a sign of a game being drawn. However, some researchers have suggested that in the field of genetics, “some researchers even suggested that in the field of genetics, draws being akin to the “drosophila” of chess research and will uncover the astonishing linkage between chess research and psychology.”

Following, I will make a brief excursion into the history of chess research and will uncover the astonishing linkage between chess research and psychology.
in which the participants were exposed to different chess positions for a short time period, revealed that grandmasters displayed a vastly superior performance compared to less experienced players, when they were asked to recall the exact configuration of pieces in the positions. Similarly to the observations made by Binet for blindfolded chess players, de Groot found that abstract organization of pieces into meaningful concepts played a key role in the superior performance of experts in chess related memory tasks.

After de Groot’s initial study the interest of the scientific community in chess as a research object increased, as it displayed a promising approach for the investigation of basic cognitive functions in the emerging field of cognitive psychology. Some researchers even suggested chess being akin to the “drosophila” in the field of genetics. What made chess especially valuable in the eyes of cognitive researchers was its well-specified and constrained rule structure, which facilitated experimental manipulation in a standardized manner. Furthermore, the leading chess associations provided a universally accepted rating system (the Elo system), which allowed exact quantification of chess skill.

Building upon the observations of Binet and de Groot, researchers discovered that there were two general cognitive processes in which expert chess players differed significantly from novices in their approach to the game. With prolonged practice expert players develop a vast system of positional knowledge that is achieved through “chunking” piece formations into meaningful concepts and an enhanced ability to shift attention quickly to the most important details of a given position. Hence, the superior performance of chess experts can primarily be explained by memory and perceptual processes.

The future of chess

Not only was chess a helpful research object to observe and test models of thought and decision processes, it also served as a bridge to the disciplines of computer science and artificial intelligence. Based on the key aspects that cognitive research revealed to be of fundamental importance for expert chess performance, algorithms could be designed that aimed to model the mental processes of top-level chess players (see blog.zeit). With the rapidly increasing processing power of computers it was only a matter of time that even the best human players would be outperformed by their machine counterparts. In 1997 Gary Kasparov, the then-reigning world-champion of chess, was beaten by a chess computer program with the name Deep Blue. Since then computers have become so powerful that even the processor of a regular smart phone could run a chess program that would beat chess world champion Magnus Carlsen with ease.
Magnus Carlsen with ease. Hence, the days that humans could compete with chess computers have long been over. Today chess algorithms are primarily used to aid the analysis of games and to discover and evaluate new approaches to positions. The search capacity of Stockfish, one of the most powerful and frequently used chess engines today, is ~70,000,000 moves per second. This is certainly an impressive number. However, according to (rough) estimations made by the mathematician Claude Shannon there are about $10^{43}$ possible board positions (including only positions that are “sensible” according to the rules of chess). Considering this unimaginably immense number, the rate by which modern chess computers can analyse positions seems tiny.

A helpful analogy is to imagine chess as a huge mountain, through which computer analysis drives tunnels. The most complicated positions are in the centre of the mountain and are gradually uncovered from both sides of the mountain, which are opening and endgame analysis. For endgames with 7 or less pieces, for example, finite solutions already exist. Nevertheless, the number of possible games is much too large to be solved by today’s technological means.

**Epilogue**

From the first research on the calculating abilities of chess players by Alfred Binet to the algorithms of chess computers like Stockfish, chess has played a formative role of today’s conception of cognition. The future will show if the multidisciplinary field of chess research will bring about more fruitful ideas and insights into our thought processes.

As a chess player myself I would like to conclude with an anecdotal appeal. To me playing chess brings the most joy when I was sitting down somewhere with a stranger or a friend, sipping a beer, having a chat about anything and everything, immersed in ardent contemplation. I can only recommend trying it yourself.

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**Selected references**


In part 2 of this blog series, I wrote about some challenges to open science practices that might be addressed by (a change of) policies at academic journals. This may solve many, but not all problems. A final and crucial challenge to open science practices is that they imply a different perspective on ownership. People’s focus should shift from “my research” to “research in general”. Taking the first perspective has traditionally provided the gateway to promotion, funding, and, at least for some, media-exposure and fame. Taking the second perspective, however, refers to contributing to the body of knowledge in one’s field: that is, a higher cause, for which the visibility of individual researchers is irrelevant. I believe that changing from an individual to a collective perspective will be necessary, yet will be the biggest challenge for all researchers.

For example, projects in the Open Science Framework (OSF) are private by default, that is, until the research team explicitly chooses to go public. My co-workers and I keep preregistrations under embargo, preferably until submitting the paper. Judging from the number of private projects on the OSF, we are not the only ones. From a “my research” perspective, it is hard to overcome the reflexive fear of being scooped: if someone else sees your project and writes about your idea first, then they will get the credit for it. However, from a “research in general” perspective this should not be a concern: if something is important it should be part of the literature, regardless of who puts it there. Ownership should not matter – yet it does. I have come across researchers who identify themselves with their particular research method to such extent that they dismiss null-findings of every independent study employing “their” method. I have even found myself in the situation that a straightforward request for study materials with the intent to conduct a direct replication study escalated into a dispute about our team’s ability to carry out the study. Such an exaggerated sense of ownership is detrimental to progress.

Despite the challenges mentioned here and in my previous blogpost, I feel strongly about my commitment to incorporate open science into my research and teaching. To be sure, the area I am working in is changing. I am happy to see colleagues reflecting on their research practices, publications calling for a change of practices in the field of Clinical Psychology (e.g., Tackett et al., 2017), relevant titles in the list of journals adopting Registered Reports and initiatives bringing together clinical psychology researchers with an interest in open science practices. However, as long as incentives in academia focus on the individual level, progress across all areas is likely to be slow. In our department, as in many institutes, tenure-track promotion depends on how many completed products (e.g., publications, supervised PhD graduations, grants) people can list on their resumes within a limited time-period. It is clear that such a policy promotes (misguided) attributions of ownership as well as strategic behavior, such as investing minimally in preregistrations. As (clinical) psychologists we know it is very unlikely that people will be able to change incentivized behavior on their own. Therefore, reward structures need to change at the level of the university. Rewarding collective effort is crucial for a successful shift towards a “research in general” perspective on ownership.

There is another benefit of rewarding teamwork rather than individual effort. Statistical illiteracy among

1 Daniël Lakens made a related point in a TEDx talk with the eloquent title “If not me, then someone else; But if not us, then no one.”
researchers is one of the reasons why psychology as a whole is in trouble. The solution is thought to lie in educating people about statistics. Of course, furthering a basic understanding is important, but investing in statistical skills at an individual level is not the ultimate solution. There is a limit to what individual researchers can do. For example, I have things to say about psychotrauma and memory that I think are pretty important for clinical theory as well as practice. To nourish this expertise, I need to keep up with the developments in several large areas of the literature. Given my teaching and other work obligations, I lack the time to immerse myself in advanced statistical methods. There are colleagues in our department who are definitely much more specialised in that area. However, those colleagues have to work under the same incentives as I do. Because they need to build their own CV, they need to limit the time they spend on consultation, and on collaborations that are not directly to their benefit. In addition, our department has only a few statistical specialists relative to the number of researchers in other (applied) areas. Ideally, every research question is addressed by a team including at least one applied statistician (Dahy, 2019). In contrast to theoretical statisticians who work predominantly on developing statistical theory, applied statisticians work on projects in close long-term collaboration with researchers in a particular content area and are appointed at the level of the research group.

With this blogpost series I hope to have contributed to an understanding in students and early career colleagues of why the problems in the field have persisted for so long. I hope to have contributed to the growing awareness in my more senior colleagues that a change in attitude is imperative (see also Wessel & Niemeyer, 2019). As researchers, we must recognize problematic research practices. As authors, we need to be transparent in writing up our studies. As reviewers, we should refrain from suggesting post hoc hypotheses or analyses. Adopting these changes in large numbers may go hand in hand with a change of the incentive structures in the scientific system. Journals could enforce preregistration and the sharing of data and materials. Policymakers could enforce open science practices by, for example, rewarding preregistrations, facilitating collective rather than individual efforts, and appointing more (applied) statisticians. I am looking forward to seeing the field grow in the coming years.

References

Ineke Wessel (Twitter: @InekeWessel) received her PhD degree from Maastricht University. She studies (emotional) autobiographical memory. Her research interests include the involvement of memory in the origins and maintenance of psychopathology and the malleability of emotional memories themselves, including false / recovered memories. Her work applies to clinical psychology (e.g. Memory processes in Posttraumatic Stress Disorder), as well as forensic psychology (eyewitness memory). Relatively recently she became fascinated with the question of what the current replication crisis in psychology may mean for clinical psychology.
From a data-driven society to the engineering of medical certainty

In 1596 Richard Hakluyt wrote the story about Sir Walter Raleigh’s travels to the Orinoco into Guiana in search of El Dorado. He describes natives (i.e. the Pairoas) that possessed a strong poison on their arrows. A poison so lethal, that those wounded by those arrows perished within 24 hours. This poison is curare, a widely used muscle-relaxant in anesthesia. Like the story of curare and its daunting introduction to western society, many other stories about medical innovations and technologies exist; artificial intelligence (AI) is one of them. Artificial intelligence as a tool of surveillance capitalism is being described as a poison to society; however, it might just be another example of a poison that could be used for the betterment of mankind, like curare. Below I present to you a book by the scholar Dr. Shoshana Zuboff that delves into a new form of capitalism, surveillance capitalism, as well as present an example of how AI is impacting advancement in healthcare at the UMCG.

For the past two centuries, planet earth has been the source for the extraction of natural resources; however, this century human behavior is the most treasured resource. Google, Facebook, Amazon, Apple, and Microsoft (among others) have thrived in a new economic system. Professor Shoshana Zuboff, Harvard Business School faculty, makes the case that these internet giants are the oligarchy of surveillance capitalism in her book The age of surveillance capitalism: the fight for a human future at the new frontier of power. Dr. Zuboff points out the parallelism between totalitarian political regimes and the highly technology-dependent society that has sprouted from the instrumentarian society we now live in. The ideas and work of individuals like B.F. Skinner, Max Plank, Mark Zuckerber, George Orwell, Larry Page, and Alex Pentland fill this book with an interesting take on how our society is transforming into a society Dr. Zubhoff refers to it as social engineering, while in China it is called social credit system.
supported by the Internet of Things. One of the recurring topics of the book is how history repeats itself. While operant conditioning and behavior modification were thought of as ideas of the past, they reemerge in our current attempts to exploit the information found in what is referred to as digital breadcrumbs or behavioral surplus; in essence, exploitation of the human experience. Dr. Pentland calls it social physics, Dr. Zubhoff refers to it as social engineering, while in China it is called social credit system. The main idea behind this social experiment is social certainty.

Projects like IBM Watson Health, claim that some of the world’s most pressing health challenges can be solved using data, analytics, and AI. Currently, this is called augmented intelligence, as human experts are conferred access to analytics and AI to provide better-consulting knowledge. During the first DASH (Data Science Center in Health of the UMCG) Sparkle Event representatives from IBM Watson Health presented their products (e.g. health plan predictive analytics, AI for imaging, life sciences’ clinical development, and oncology clinical trial matching and genomics). At the UMCG, DASH supports healthcare professionals, researchers, teachers, students and private partners with machine learning, data science, and AI; with the aims of advancing data science in health. Augmented intelligence is a reality and is here to stay. I would highly recommend learning about previous experiences with systems that involve AI to understand their capabilities and respect their impact. The book: The age of surveillance capitalism by Professor Dr. Shoshana Zuboff, provides insight on how AI has transformed our economy and our lives.

**BY JAIME MONDRAGON**
Does gut flora affect the onset and maintenance of bipolar disorder? Can plant roots be mimicked by 3D-printing robots? These were some of the questions that were raised at the BCN Winter Meeting of 2020, which took place deep in the UMCG. The well-attended meeting consisted of both presentations and a poster session.

During the day, six short talks were given. These were on a variety of subjects, ranging from an examination about ways to stimulate replication research to studies on the effects of sleep deprivation on the brain. They were to the point and surprisingly accessible to non-experts. The last of these presentations was given by the winner of the BCN dissertation award, Danique Vlaskamp, who gave a lecture about distinguishing different kinds of epilepsy on basis of genetics. Not only did she do genetic research, but she also examined potential applications of it by studying the effects of genetic counselling. Besides that, a longer keynote lecture was given by Romain Brette, a theoretical neuroscientist at the Vision institute of Paris. He made the case against the idea that neuronal activity encodes the image we have of the outside world. Instead, he argued for a more dynamic relation between brain, body and environment.

The posters were made by BCN research master and PhD Students, and, like the presentations, were also about a large variety of topics. To name some examples, there were posters on the effects of breakups on the brain and cognition, the relation between hay fever (and conditions like it) and psychosis, and the consequences of stress for the brains and behaviour of rats. Awards were given to the best research master poster and the three best PhD posters.

What stood out the most during the meeting was the interdisciplinary character of it – besides neuroscientists, there were also engineers, philosophers, psychiatrists, psychologists and others present. This led to interesting interactions. A philosopher and an engineer talking about whether plants have minds is not something you see every day, after all.

BY JOOST SCHREUDER
PHOTOS BY SANDER MARTENS
On the UMCG Research Safari

On Thursday 6th of February the Research Safari of the UMCG took place, organized for researchers to spot and explore the Big Five Research Institutes of the UMCG: CRCG, GUIDE, Kolff, SHARE, and of course, BCN. The event started one hour after Dutch lunchtime with a welcome by Marian Joels and with Anna Gimbrere as a keynote speaker.

The logistics for the safari consisted of small groups of researchers, one map of the UMCG, and a card with the name of each institute with space for a sticker given by the presenters as proof of attendance. Every institute had three groups presenting, for every wave of groups appearing, and lucky enough, my research project team ‘ReCONNECT’, was selected to be one of the representatives of BCN.

We were situated on the second floor of the neurology department, where every Monday the neurology ward meets for the weekly briefing and to discuss patient cases. It was our location for three hours. Our strategy was to give a good overview to the explorers of what we do; we started with a small presentation of the overarching objectives of our project and which neuroimaging techniques we used. Then Mayra Bittencourt and I, split the groups in two, to have a more personalised programme, followed by a switch of groups.

The groups were very diverse, bringing exciting questions to the table, from epidemiology, genetics to social sciences. Later on, we gave them their sticker, which for BCN was an elephant (in the room), after which they could move on to the next institute.

It was an interesting and entertaining afternoon, it showed me how big the UMCG is, and that BCN has the opportunity to collaborate with exceptional people from the other Big Five.

TEXT AND PHOTOS BY SEBASTIÁN BALART SÁNCHEZ
Cool links

> Pluto has a nitrogen “heartbeat”

> Hand-washing in airports slows the progression of epidemics

> Scientists have mapped the evolutionary history of 2,658 cancers
  https://www.nature.com/articles/s41586-019-1907-7

> Elephants seem to mourn dead loved ones long after they have passed away
When someone used to ask me this question during my first year I would give the standard response ‘it’s going great’ but by the middle of the second year my response just mellowed down to, ‘Yeah it’s going on’. The answer to this question is never the same. There is at least one point in the course of a PhD (in my experience, more than one) when you struggle responding to this question positively. The following image illustrates the journey of ambition throughout the course of the PhD.

So let me just start by being straight up: a PhD is not a bed of roses. There will be instances when you will doubt yourself, you will doubt your motivation for starting a PhD, you will think that you know nothing, you might even go on to call yourself ‘stupid’, you will think that everything is going wrong with your life, you will feel that you are lonely in this world with your research problems with no one to understand you, etc. etc. Believe me when I say this, “you are not alone”.

If you go and talk to other PhD colleagues who are traveling in the same boat, you will find out that you are not the only one who feels like this. In situations like these you should pause your thoughts for a bit, take a step back, analyse the situation and try to find reason as to why are you feeling like this? The most common reasons are comparing your progress with other PhD students and things not going as per ‘THE’ plan.

Don’t compare the progress of your PhD with fellow PhDs on any ground. The most common being comparing the number of publications. It’s very easy to fall into this trap but one must keep in mind that it is a very unfair means of comparison as every PhD is different. It will not be an overstatement to say that each PhD has its own destiny. This means that the challenges that one faces during the course of their PhD will be different. Some PhDs may require collection of data from patients, which can lead to huge dependence on hospitals, schedules of the patients, ethical clearance committee, etc. Some might require collection of physiological data which is tricky and they might have to spend months on developing a perfect experiment that resonates with their goal. And once they have established the optimal experiment then they start with the data collection which can in turn take months. Some people will work on already available datasets, say for video to text generation, etc., but they will have dependencies like the availability of the hardware so that they can start building a model which might take days/weeks just to train. Some people would be trying to understand a certain disease to develop a cure, or developing environment friendly substitutes, etc. I think by now you got my point: ‘EACH PhD IS DIFFERENT AND HENCE CANNOT BE COMPARED’. Also, in my opinion publications are the byproducts of your research, a means to let the world know what you found so that others can build upon it. The most important thing is
the realization that you’ve tried solving a problem with all you had and you couldn’t have done it better. Another important thing to be kept in mind is that it is literally Re-Search, you are trying to find a solution by re-searching the evidences and work that has been done by others in the field and trying to search what went wrong and how it can be amended or how the previous solution can be improved. Logically speaking there cannot be a plan that is perfect since you don’t know what road you might have to take to reach the solution that you desire. The thing you might think to be the ‘THE PLAN’ for the PhD is just your best guess, the guess that you made before actually starting your PhD and without knowing the depth of the problem you are going to solve. The difference between ‘THE PLAN’ and the actual course of the PhD is what the following image illustrates (I know it’s a bit of an exaggeration to call ‘THE PLAN’ to be TV science but it will get the point across. Also, it’s a cool illustration).

Another common feeling that one feels is that of frustration when one does not get the results that one expects. For situations like this it might be beneficial to talk to one’s supervisor or someone else in the field to get a new perspective, or re-search to see what you missed. It might also be good to motivate yourself by remembering why you chose to do a PhD in the first place.

If you have recently taken the road to a PhD or thinking about applying for one then I would say welcome, this will be one of the craziest but best roller coaster rides you will ever experience. You will be excited in the start, might become a bit nervous during the ride but will feel immense happiness and pride once you have finished the ride. If you are in the middle of your PhD then this article was more for you and I would just say ‘my friend, you are not alone’. The people who are about to finish their PhDs, I hope that there were points in this column where your eyes opened wide and the words ‘I can relate’ had come out of your mouth.

**BY PALLAVI KAUSHIK**

P.S. This column is not written to dissuade you from pursuing a PhD or to do research in general but to bring forth the problems that one might have to face during the course so that you are well equipped.
The BCN Sinterklaas celebration

On December 5 the BCN PHD council organized a traditional Dutch Sinterklaas celebration. Not with ‘gedichten’ (poems) and ‘surprises’ (a complicated way of wrapping your present), but with a dice game. For those who are not familiar: the idea is that everybody brings one or two presents, which are all put in a big pile. By playing a dice game it is then determined how the presents are distributed among all participants.

Around 6 pm we gathered at Café The Crown with a very nice group of people. All participants had put a lot of effort into bringing awesome presents, including a mini baseball game, a very special bag of ‘pepernoten’ and a ‘cool toy’ (which actually was the name of the toy, we’re still not sure what was inside). As the game approached its ending, everybody became more and more eager to get the presents that they wanted most. When the game was over, some additional, voluntary trades were made so that in the end everybody was happy with the presents they got. And with all these new presents in our bags, we very much enjoyed the rest of our evening with good company and nice beers.

We want to thank all participants for their enthusiasm and ‘gezelligheid’!
See you in 2020!

■ BY EMILE D’ANGREMONT, PHD COUNCIL
Change reimbursement of external courses and visiting scientific conferences
As of January 2020, BCN will reimburse visits to scientific conferences no matter whether you do or do not give a presentation or present a poster during the event. The maximum amount is 600 euros per calendar year (Jan-Dec) for all BCN PhD students. Remember that there is also a budget for external courses: max 600 euros per calendar year (Jan-Dec). In addition, reimbursement forms of external courses and scientific conferences do not have to be sent in advance; but please send the form within 3 months after the visit to the BCN Office. You will find the reimbursement forms on the BCN website (https://www.rug.nl/research/behavioural-cognitive-neurosciences/education/phd/funding). Please check the conditions stated on the forms and add all proofs of your visit and payments! Incomplete forms will delay the reimbursement.

BCN Winter meeting
On February 6, 2020 the BCN Winter Meeting took place. It was a very successful meeting. 6 BCN Staff members gave a Tedlike talk, 58 PhD Students and 35 Research Master Students presented their posters, and 1 former PhD student won the BCN Dissertation Award. Congratulations Danique Vlaskamp! She took home the Dissertation Award and gave a very nice talk! The best PhD posters were those of Janne Rozemarijn (Romy) Smit, Justine Dickhoff and Marjorie van Kooten. Congratulations ladies!

BCN Conference 2020 - Update
Nothing but the Truth!, the BCN Conference in 2020, will take place on October 19 and 20. I informed you already that Arjan Lubach, John Ioannidis and Erik-Jan Wagenmakers accepted the invitation. More names to google: Naomi Oreskes, Cailin O’Conner and Heather Douglas also confirmed their participation! Block the dates in your agenda! We’ll keep you informed!

Agenda BCN Activities
> March 26 and 27, 2020:
  BCN Retreat
> March 25, 26, 30, 31 and April 2, 2020:
  BCN Advanced (non)linear regression techniques in R
> April 2, 9 and 16, 2020:
  BCN Project Management Course Part 1
> April 9, 16, 23, May 14 and 20, 2020:
  BCN Analyzing (event-related) EEG using MATLAB - a practical EEG Analysis workshop
> May 14, 2020:
  BCN Retreat (extra day)
> June 15, 16, 18, 24 and 25, 2020:
  BCN Statistics Course
> June 18, 2020:
  BCN PI Meeting
> October 19 and 20, 2020:
  BCN Conference Nothing but the Truth

Course application
https://cursus1.webhosting.rug.nl/gsms/courses/bcn-courses/
Please check the website for more detailed information.
BCN poster prizes
On February 6th, the 2020 BCN winter meeting took place (see page 28). The BCN poster prize was awarded to three PhD students: Justine Dickhoff, Marjorie van Kooten, and Janne Rozemarijn (Romy) Smit. Lukas Breitzler won the BCN master student poster award. Congratulations!

PhD Posterprize

Master Student Poster Prize
**BCN dissertation prize**

This year’s three nominated dissertations were written by Stefan Knapen, Berry van den Berg and Danique Vlaskamp. The jury’s chair, Sonya Pyott, revealed during the winter meeting that Danique was the proud winner of the 2020 BCN dissertation prize.

**Donders Brinkhorst prize**

Ronald Bierings has been awarded with the Donders Brinkhorst prize for his dissertation “Insight into Light”, judged to be the best PhD thesis in the field of ophthalmology.

https://www.oogheelkunde.org/donders-brinkhorst-stichting

*PHOTO BY MARISKA DE GROOT*
**ERC Consolidator Grant**

UT/UMCG Scientist Sarthak Misra has been awarded an European Research Council (ERC) Consolidator Grant. Sarthak Misra is a full professor in the Department of Biomechanical Engineering (UT) and Department of Biomedical Engineering (UMCG). He will be awarded € 2.35 million to further expand on his research on developing novel steerable instruments for minimally invasive surgery.

**Project Maestro**

in his project MAESTRO (Magneto-Acoustically Engineered Steerable Robots), Sarthak’s goal is to design a magneto-acoustic robotic system that will enable precise delivery of a wide range of diagnostic and therapeutic micro-agents using ultrasound and fluorescence images. “A novel probe and micro-agents will be designed and evaluated in clinically-relevant scenarios with realistic physiological functionalities”, says Sartak. The knowledge gained will be applicable to a range of flexible instruments.

**Previous grants**

several EU and national grants have been awarded to Misra already, such as the ERC Proof of Concept grant in 2017 for his work on flexible needles, an ERC Starting grant in 2014, and VENI (2010) and VIDI (2015) awards from the Netherlands Organization for Scientific Research (NWO). Please visit the Surgical Robotics Laboratory website for further details on his research.


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**EU ITN grant voor MANIC**

The EU Marie Curie Actions have awarded approximately € 4 M to MANIC (Materials for Neuromorphic Circuits), an Innovative Training Network, coordinated by professor Beatriz Noheda of the Zernike Institute for Advanced Materials (ZIAM) and by Dr. Jean Fompeyrine (IBM Research-Zürich). Jos Roerdink and Lambert Schomaker (Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence) are also taking part in this European multidisciplinary consortium.

In the movies, newspapers and other media sources, psychosis is often linked to violence and aggression. However, contrary to popular belief, people diagnosed with a psychotic disorder are more often the victim than the perpetrator of a crime. Although victimization can have a major impact on people’s lives, no evidence-based intervention targeted at victimization in psychosis is available. To prevent victimization of individuals with a psychotic disorder a body-oriented resilience therapy has been developed, based on pre-defined putative associated factors derived from the literature.

In this dissertation Elise van der Stouwe firstly assessed the efficacy of this therapy at the behavioral level. In a pilot study...
aimed at testing the therapy, patients subjectively indicated a positive effect of BEATVIC on (risk factors of) victimization. However, in the subsequent multi-center randomized controlled trial van der Stouwe and her colleagues found no differences between the BEATVIC group and the befriending group (control) directly after the intervention period on validated questionnaires assessing victimization, aggression regulation, social cognition, interpersonal behavior, illness insight, self-esteem and self-stigma.

In the second part of her dissertation van der Stouwe focuses on the neural level. Based on her fMRI sub study victimization is associated with more deactivation of the sensorimotor network in response to angry faces in victimized patients, possibly indicating a ‘freeze’ reaction. Following the therapy changes in activation patterns in specific brain networks were found; findings that may indicate more elaborate processing of visual information and/or an increased alertness for potentially dangerous faces, and enhanced action readiness in response to indirect threat. By reviewing studies on the effect of exercise interventions on the brain, it was shown that these interventions in general have a positive effect on different brain regions and connections.

Elise van der Stouwe (1990) studied Psychology and Neurosciences at the University of Groningen. During her doctoral research she was connected to the research institute BCN-BRAIN of the University Medical Center Groningen (UMCG). Currently she works as a postdoctoral researcher and psychologist at the department Psychiatry of the UMCG. She was promoted on October 28, 2019.

Advancing transcriptome analysis in models of disease and ageing

PHD STUDENT
T.V. de Jong

THESIS
Advancing transcriptome analysis in models of disease and ageing

PROMOTORS
Prof.dr. V. Guryev
Prof.dr.ir. E.A.A. Nollen

FACULTY
Medical Sciences

RNA-sequencing technologies allow us to peak behind the curtain of biomolecular mechanisms which drive all known life on earth. The process of RNA synthesis is influenced by many factors, both
intrinsic and extrinsic, on both micro and macro scales. In most RNA-sequencing experiments a component of a genetic pathway is manipulated after which changes on RNA abundances are investigated. In this thesis we exemplify multiple RNA-sequencing experiments and reveal the dynamic range of information which can be taken from different experimental conditions using a rich toolbox of analytical methods.

Tristan de Jong (1990) studied Bioinformatics at the ‘Hogeschool of Arnhem and Nijmegen’ and the University of Wageningen. During his doctoral research he was connected to the research institute BCN-BRAIN of the University Medical Center Groningen. Currently he works as entrepreneur. He was promoted on October 28, 2019.

Time & other dimensions

P H D S T U D E N T
N. Schlichting
T H E S I S
Time & other dimensions
P R O M O T O R S
Prof.dr. D.H. van Rijn
Prof.dr. R. de Jong
F A C U L T Y
Behavioural and Social Sciences

Time is complicated. One hurdle in studying the subjective experience of time is that we don’t have a sense for duration and time as we have for light (the visual system) and sound (the auditory system). However, everything we do, perceive, or cognize about is always extended in time – the way human minds work is inherently temporal. Time never occurs alone, but is embedded in context, change, and other dimensions. The studies reported in this thesis explore time in relation to other dimensions: numerosity (i.e., the total number of things given at a specific point in time), space, and human-like movement. We found that participants use different sources of information to make temporal decisions – there are different types of “timers” or strategies to extract duration information. We showed that time can be translated into different representations with only little costs in accuracy and precision. No matter how complex the to-be-timed event, observed timing performance adheres to general time perception laws. Overall, in line with the interval perception literature, we observed great flexibility in timing behavior regarding task and stimulus design. It therefore seems unlikely that there is one underlying mechanism or neural substrate (i.e., an “internal clock”) orchestrating all of this observed behavior. In the final chapter of the thesis, I discuss how there is actually no need for such an internal clock, because time is integral in all other dimensions, in the way we cognize about and interact with our environment.

Nadine Schlichting (1990) was promoted on October 31, 2019

Social stress: the good, the bad, and the neurotrophic factor: Understanding the brain through PET imaging and molecular biology

P H D S T U D E N T
B. Lima Giacobbo
T H E S I S
Social stress: the good, the bad, and the neurotrophic factor: Understanding the brain through PET imaging and molecular biology
P R O M O T O R S
Prof.dr. E.F.J. de Vries
Prof.dr. E. Bromberg
Prof.dr. R.A.J.O. Dierckx
C O P R O M O T O R
Dr. J. Doorduin
F A C U L T Y
Medical Sciences

The growing burden of social pressure is reflected by the increasing number of stress-associated health issues around the globe. One example of a stress-related health issue is depressive disorder. Depression is considered a major global health issue, affecting every cultural, economic and age group. The work described in this thesis aimed to investigate how different social stimuli
– beneficial or harmful – can affect the brain. In this context, we mimicked different environments that are usually observed in humans in animal models, which allowed us to investigate how the brain of the animal physiologically responds to different social stressors, focusing especially on memory, inflammation of the brain, and a protein involved in proper functioning and survival of brain cells: the brain-derived neurotrophic factor (BDNF). In this thesis, we describe that social environment is able to increase or decrease BDNF levels in the hippocampus, when animals were exposed for a long time to beneficial or harmful social interactions, respectively. However, when animals were exposed to acute social and physical stress, there was no effect on BDNF concentration. We also found that animals submitted to harmful social stress showed transient effects on behavior, which had normalized after two weeks. Brain inflammation, as observed by positron emission tomography, was also normalized after two weeks. We concluded that the effect of short social stress exposure was temporary, showing an effect after a few days, but normalizing a few weeks after exposure to the stressor, but long exposure to social stimuli can induce lasting modification of brain functioning.

**Bruno Lima Giacobbo** (1988) studied Molecular and Cellular Biology at the Rio Grande do Sul State Pontifical Catholic University in Brasil. During his doctoral research he was connected to the research institute BCN-BRAIN of the University Medical Center Groningen. Currently he works as a postdoctoral researcher at the Umeå Universitet in Sweden. He was promoted on November 4, 2019.

**Childhood-onset movement disorders: mechanistic and therapeutic insights from Drosophila melanogaster**

**P H D S T U D E N T**
R.A. Lambrechts

**T H E S I S**
Childhood-onset movement disorders: mechanistic and therapeutic insights from Drosophila melanogaster

**P R O M O T O R S**
Prof.dr. O.C.M. Sibon
Prof.dr. M.A.J. de Koning-Tijssen

**C O P R O M O T O R**
Dr. T.J. de Koning

**F A C U L T Y**
Medical Sciences

Pantothenate kinase-associated neurodegeneration (PKAN) and North Sea Progressive Myoclonus Epilepsy (NS-PME) are childhood-onset movement disorders caused by two distinct genetic defects. In PKAN, there is a defect in pantothenate kinase, necessary for the production of coenzyme A (CoA). Why this defect leads to disease is unknown, which precludes mechanism-based treatment of the disease. In this thesis, using the fruit fly as a model, steps are made to unravel the mechanisms behind PKAN and develop a treatment for the disease. Important findings include the development of a compound that counteracts the PKAN-related abnormalities in fruit flies, and the identification of biochemical steps that influence the disease process in the fruit fly. These findings contribute to efforts to transform PKAN into a better understood and hopefully treatable disease.

In addition, the fruit fly is used to better understand NS-PME. Patients with NS-PME suffer from, among other phenomena, muscle twitches (myoclonus) and epilepsy. A clinical observation, exacerbation of symptoms by heat, was corroborated by patient interviews and translated to a fruit fly model of the disease, which features sensitivity to heat-induced seizures. Glial cells, cells in the nervous system considered as supportive to nerve cells, proved to be crucial in this model. This insight changes the common perception about the nature of NS-PME, which may not originate in nerve cells but rather in the glial cells. Further research into the processes connecting glial cells and nerve cells may help elucidate the mechanism behind NS-PME.

**Roald Lambrechts** (1990) studied initial Chemistry (bachelor) at the ‘Vrije Universiteit Amsterdam’, and then moved to Groningen for the lateral entry and later the master Medicine. Currently he works as doctor’s assistant neurology in the University Medical Center Groningen. He was promoted on November 13, 2019.
Latitudinal differences in the circadian system of Nasonia vitripennis

PHD STUDENT
T.S.E. Floessner

THESIS
Latitudinal differences in the circadian system of Nasonia vitripennis

PROMOTORS
Prof.dr. R.A. Hut
Prof.dr. D.G.M. Beersma

FACULTY
Science and Engineering

Theresa Floessner has investigated the circadian clock of Nasonia vitripennis, a small cosmopolitan parasitoid wasp. Her interest was the ability of the circadian clock to adapt to different environments and day lengths (as at different latitudes) and the mechanism that drives this adaptation and seasonal timing. For this purpose she performed comparative studies between two European Nasonia lines, one from Finland and one from France.

Daily and seasonal environmental changes are initiated by gradual variation of temperature and day length, following different patterns across a latitudinal cline. These recurring events are predictable by an adaptive circadian clock. The circadian clock times molecular, physiological and behavioural processes in nearly all organisms on a daily and annual bases and can synchronise to the environment, mainly by light. The circadian core clock mechanism is conserved through various organisms like bacteria, insects and mammals. Strategies of how the circadian and annual timing system interact to anticipate to different environment and its specific conditions are divers and species specific.

The results of Floessner let us assume that probably a natural mutation of a specific clock gene leads to a longer internal period in the northern Nasonia which allows them to enter diapause (= dormancy) earlier in the year so they can survive the harsher winter condition in polar regions. Additionally, in order to enable daily circadian adaptation, it seems that the northern line is more sensitive to light, resulting in a daily reset of the internal clock by light.

Theresa Floessner (1986) was promoted on November 22, 2019.
In the heat of the moment: How Drosophila melanogaster’s response to temperature is modulated by sensory systems, social environment, development, and cognition

PHD STUDENT
A Soto Padilla

THESIS
In the heat of the moment: How Drosophila melanogaster’s response to temperature is modulated by sensory systems, social environment, development, and cognition

PROMOTORS
Prof.dr. J.C. Billeter
Prof.dr. D.H. van Rijn
Prof.dr. O.C.M. Sibon

FACULTY
Medical Sciences

The work presented here demonstrates that temperature is a fundamental component of many fundamental aspects of a fly’s life. Starting with early development, the temperature at which a fly grows will determine how well it can cope with the climate challenges in its later adult life. Once in adulthood, an intricate system of peripheral and brain thermosensors coordinates how flies respond to dynamic temperature changes. This response is not just a predictable reaction; it is a complex process that can be affected by other internal and external features of the fly, such as its own sex and the sex of surrounding flies. Considering the relevance of Drosophila as a model organism, it is fundamental to continue exploring how temperature interacts with the other features of fly’s existence, as it will help us predict how small ectotherms might be affected by climate change, while also answering basic neuroscience questions, such as how a brain integrates temperature information.

Andrea Soto Padilla (1987) studied Medicine at the de National Autononous University of Mexico (UNAM). Subsequently she was a master’s student in Cognitive and Behavioural Neuroscience at the University of Groningen (RUG). Her PhD research took place at the Groningen Institute for Evolutionary Life Sciences, at the UMCG and the Psychology Department of the University of Groningen. The title of her dissertation is: “In the heat of the moment. How Drosophila melanogaster’s response to temperature is modulated by sensory systems, social environment, development, and cognition”. She was promoted on January 6, 2019.

■ EVELYN KUIPER-DRENTH, ON THE BASIS OF PRESS REPORTS OF THE UNIVERSITY OF GRONINGEN
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!
“Words reduce reality to something the human mind can grasp, which isn’t very much.” – Eckhart Tolle  
> Elise van der Stouwe

“Life doesn’t get any easier, we just get better at it.” - Pieter de Jong  
> Tristan de Jong

“A man was looking beneath a streetlight for a penny, when asked he said: “I lost it over there in the dark, but I look for it here because I can only find it when ground is lit.” – an old Russian joke  
> Tristan de Jong

“The moment we can no longer afford to apply advances in medicine to our patient care, our society has the choice between a financial and a moral bankruptcy.”  
> Roald Lambrechts

“Either we all live in a decent world, or nobody does.” - George Orwell  
> Roald Lambrechts
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