



InCognito

For all your study-related needs and feeds

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Brainy interview: our own Pierre Gianferrara!

By Margot Morssinkhof

Pierre Gianferrara started the MBCS master last year, but he stopped the master early because he got in to an amazing PhD programme at Carnegie Mellon university, Pittsburgh. Congratulations Pierre! Can you explain a little bit about your background and about the PhD programme that you're in now?

First of all, thank you very much for interviewing me! It's so nice to hear from you guys. My background is a bit all over the place. I did my Bachelor's degree in Cognitive Science at McGill (Montreal, Canada) with a minor in Computer Science. Then I did a Master's in Computational Neuroscience (mostly, AI) at the University of Edinburgh (Scotland, UK). Then I joined the MBCS programme at the University of Amsterdam in the Cognitive Neuroscience track, and now I've got in the Ph.D. programme in Psychology and Cognitive Neuroscience at Carnegie Mellon University (Pittsburgh, USA) with Dr. John R. Anderson as my advisor. Effectively, I am interested in developing computational cognitive models of (human) motor learning in video games. Right now, we are trying to model how people learn how to play the "Space Fortress" video game. To do so, we need to model the behavioural output (sequences of keypresses) as well as neurophysiological activity (using things like EEG, fMRI and MEG techniques).

How did you find and get into the PhD programme?

Mostly by googling what I was interested in! I think that when you are at the Master's level, you still have a lot of options that are open, so it's the perfect time to be wild and contact the professors you really want to work with, no matter where they are in the world. I contacted Ph.D. students, post-doc students and professors in September 2017 (so a year earlier...).

Also, a tip for MSc students who are interested in Ph.D.s, always check for funding first! It's very important to know who is going to fund your research, and in some cases, you might need to apply for extra funds yourself...

How are you liking your PhD programme so far, is it like you expected it to be?

Yeah! The Ph.D. is basically what I thought it would be. It's pretty much up to me to do whatever I want haha. Then I just go ask profs for advice and/or references if I need them. Right now, I'm doing a lot of data mining on the log files of previous games to find statistical regularities in people's sequences of keypresses. What I like about CMU is that it is very interdisciplinary, so I interact with people from Neuroscience, Psychology, AI, Robotics, Human Computer Interaction, Computer Science and many more.

What aspects of the MBCS master have helped you so far?

The MBCS programme gives a good idea of how research works. It introduces us to the grant application process, how to ask interesting research questions, think about the operationalization of variables of interest etc. I know that many students did not enjoy taking the "Neurophysiology" class in the Cog. Neuro. Track, but honestly, the slides we were given give us a good intro to pretty much any neurophysiological technique we might want to use or see in the literature. It's a great advantage to know what you should use in your research, and a lot of people around me are still pretty confused about what is needed to do what they're interested in!

A tip to y'all: Make sure to take advantage of the resources available to you at the UvA because there are a lot of experts with valuable knowledge out there!



What do you wish someone told you before, do you have any tips for others who aspire a PhD in a similar field?

Keep contacting professors, students, and pretty much anyone who is interested in something similar! People are usually pretty open to discussing their passion. If you show interest in someone's work, then they'll give you a lot of valuable information which you may find helpful later on. Honestly, get out there, talk to people, discuss your ideas, and develop your independence as a researcher. As a grad student, one of the most valuable skills to learn is how to figure out how to do something that nobody ever taught you.

What are your aspirations for the future, what are you looking forward to during and after the PhD programme?

I have a lot of ideas. I want to make/use computational models of the basal ganglia and the cerebellum to figure out how people learn how to time sequences of motor movements. If I can use the ACT-R cognitive architecture (Dr. Anderson's model) and other lower-level computational models of brain regions to model human motor learning in Space Fortress, then I'll be pretty happy! The next step will be to translate these computational models into the development of software in the realm of Human-Computer Interaction. One of my main research goals is to develop better Human-Computer interfaces that could parametrize humans' learning of cognitive & motor skills. I think there could be a lot of applications for robotics and educational technology.

Let's be nice

By Sven Wientjes

Do you ever feel people are often unreasonably unkind to others? That the language some people use is rude or offensive? Do people cut too much in line or fail to greet you back? The Dutch foundation for idealistic marketing (SIRE: Stichting Ideeële REclame) has started a campaign to make the Dutch population more conscious of these issues.

SIRE is an independent foundation, kept running by financing and air-time donated by the collective of communication companies and 14 large other companies (among which the Albert Heijn supermarket, Heineken and Unilever). SIRE is well known in the Netherlands, they have been actively starting debates on social issues for over 50 years now. Examples include campaigns about the dangers of fireworks, drunk driving and about responsible citizenship.

Their newest campaign, #DOESLIEF, is about increasing the kindness people show to each other in the public sphere. 'Doe 's lief roughly means 'try to be kind'. SIRE has chosen the path of confrontation by collecting stories and statistics about the rude behaviour people show and presenting these to the public. They counted that the word 'kanker' (cancer, one of the worst curse words in Dutch) was used 146.571 times on Twitter last year. 'Klootzak' (meaning ball sack, similar to jerk) was used 53.265 times. Last year, the number of police calls for fighting neighbours increased by 3600 and giving deserved priority in traffic has decreased by 26% in ten years. SIRE hopes that by confronting people with this increase in rudeness,

people might recognize their own behaviour more readily and that this leads to a change. Professor Paul van Lange of the Vrije Universiteit (VU) helped set up this campaign. He says recognition plays a big role in making a collective change. By seeing other people being more conscious about being nice it can create a kind of 'team spirit', leading to more effective changes on a larger scale. (1)

On the contrary, professor Victor Lamme from the UvA believes it is counterproductive to confront people with the increasing prevalence of rudeness. He believes humans have a herd mentality and will imitate the rude behaviour since this information normalizes it. He believes that it would be more effective to reward nice behaviour. He also criticizes the weight with which SIRE presents to problem of rudeness: According to Lamme there are lots of positive trends in society happening at the moment, such as continuously decreasing crime rates and the decreasing number of Dutch citizens that feel 'unsafe' (from 36.7 percent in 2013 to 34.1 percent in 2017). Most noticeably, the national bureau for social statistics (CBS) tracks the perceived regularity of disrespectful behaviour in the streets. In 2013, 22.4% of people believed this happened regularly, while in 2017 this is 20.1%. If the world is as bleak as SIRE wants us to believe is thus not obvious. Isn't it also worth it to focus on these positives, and couldn't we become nicer people just by being aware of this? SIRE has the tendency to cause a lot of controversy and debate with any campaign they create.

These are often the subject of jokes between people and online while they are running, yet multiple of their slogans have become established sayings in Dutch culture. One of these is 'je bent een rund als je met vuurwerk stunt', meaning 'you are a cow if you play with fireworks'. An obviously silly statement that people used ironically at first, rolling their eyes and laughing when they said it. These days, the sentence is still used, it is established and normalized possibly through the ironic use it had at first. It could be that 'doeslief' meets a similar fate, and everybody starts acting nice for the years to come. However, being nice is a way more abstract goal than decreasing the number of firework related incidents or the prevalence of drunk driving. Besides, what if releasing your frustration is healthy? Pent-up feelings do not have the best reputation in popular psychology, it could be that SIRE is indirectly promoting this with their campaign.

(1) <https://www.metronieuws.nl/in-het-nieuws/2019/03/sire-houdt-nederland-een-spiegel-voor-met-doeslief>



Victor Lamme
@VictorLamme

Following

Replying to @UvA_Amsterdam @Metro

Vooral verbazingwekkend dat een sociaal psycholoog niet weet dat je met het foute voorbeeld nog meer fout gedrag stimuleert.

Translated from Dutch by Microsoft

It is particularly surprising that a social psychologist does not know that the wrong example encourages more of this undesirable behaviour.

12:58 AM - 6 Mar 2019

Victor Lamme in response to the doeslief campaign and professor Paul van Lange's involvement.

Announcements

By Sven Wientjes

Unifind

Are you sometimes short on money, but do regular jobs not interest you or cost too much of your time? The company 'Unifind' is looking for students who would like to sit in the live audience during the taping of different tv shows. Unifind is a startup that wishes to search for fun small jobs for students in the future. For now, it seems like their tv-audience jobs are for Dutch television shows, but it might be worth signing up, since they could expand into fun jobs for international students in the future! You can sign up through their website at: www.unifind.nl

BetaBreak

Have you ever seen one of those small lectures that sometimes happen in the hall at Science Park, or the Facebook events advertising them? These are organized by the BetaBreak, every third Wednesday of the month. Currently they are looking for students to join their team, so if you

think this would be fun or look good on your resume, you can email them at redactie@beta.break.nl. You will get the change to expand your organization and interviewing skills together with fellow students from various disciplines. A true interdisciplinary setting, which means the perfect fit for an MBCS student! ☺

Perspectives on Neuroscience

Het Klaslokaal, an initiative of the club and 'cultural institute' called De School, is organizing an event called Perspectives on Neuroscience. For three weeks there will be several lectures and a practical, given by scientists and philosophers, all experts in their relevant fields. The event starts off on Wednesday the 13th of March with a one-and-a-half-hour lecture on the Philosophy of Mind, the field that already for hundreds of years has tried to claw at many of the questions that drive modern (Cognitive) Neuroscience. One week later, on Wednesday the 20th of March, there will be a lecture on the sleeping brain by prof. Ysbrand van der Werf, an authority in this field. The following day,

Thursday the 21st of March, there will be a dissection of a calf brain, potentially very interesting for those of us without this kind of lab experience! The final lecture is the following week, on Wednesday the 27th of March. This is about Computational Neuroscience, a direction the field is heading towards. This lecture will not shy away from insights from machine learning and speculation about futuristic topics and the seemingly limitless possibilities of the virtual world. Every lecture costs 10 euros to attend, or 15 euros including the famed 'weekhap', the meal of the week at De School. The calf brain dissection practical costs 12.50 euros.

Science & Cocktails Amsterdam

Monday the 8th of April Science & Cocktails Amsterdam organizes a lecture by philosopher Max Welling. He will talk about artificial intelligence, its benefits and its threats. It is held in Paradiso Noord, a beautiful location in one of the most attractive parts of our lovely city. The event costs 5 euros for students and will host live music after the lecture. And, of course, there will be cocktails throughout.



ETERNAL FAME



Jill Blok, congratulations for being the only one to solve the neuroscience puzzle of the January edition! You will receive a personalized present soon!

NEUROSCIENCE JOKE

Why did the neuron like to sleep in the bunk bed?
Because it wanted to have a high resting potential...

Looking in the mirror: What you see is what you get

By Evan Lewis-Healey

You're walking down the street, and you see an old woman trip and fall. It's nasty. The bystander effect doesn't come in to play here - people all around her are struggling to help. From afar you see the bruise that has formed instantaneously on her temple, swelling larger and larger after her every breath, and you can't help but wince. That feeling that you get - shivers are sent up your spine, your mouth goes dry, and your hairs stand on end. As you read this you might even feel the same. This isn't just sympathising with her, you genuinely feel her pain; this is how your brain empathises with her.

Empathy is just this - the ability to put yourself in someone else's shoes, and to fully understand what someone else might be feeling. Within neuroscience, empathy hadn't been researched for a long time - such an abstract concept seems hard to define at a neural level. However, at the Social Brain Lab, Christian Keysers and Valeria Gazzola have been attempting to integrate empathy into Cognitive Neuroscience.

Before conceptualising empathy within the brain, Keysers dedicated much of his work to the study of mirror neurons. These neurons have been found in electrophysiological studies in Macaques. For example they fire both when the monkey grabs a cup and when they see someone else grab a cup - the same neurons fire when they see an action performed, and when they actually execute the action. This is just one example of the ways that mirror neurons work, and this illustrates that they work vicariously - the neurons live through the experience of others.

Fast forward a few years, to when Keysers started working in the Netherlands, and work on the mirror neuron system had exploded. The development of fMRI and other brain imaging tools also gave a new found opportunity to investigate the vicarious aspect of brain activity in humans. The system was extended; not only were there motor mirror neuron systems, but also emotional ones - significant insula activity was found both when participants experienced unpleasant smells, and when they saw others experience unpleasant smells. Perceiving the experience of disgust also led to feeling disgusted. Which leads us to where we are now in social neuroscience - a neural basis of empathy.

So here we have it - the empathic brain. One that lives through the experience of others. But, as we all know, we all experience and perceive the world very differently. Different degrees of empathy in people correlate with the degree of activity in both motor mirror systems, and emotional mirror systems. And there are certain types of people that (are thought to) have a complete lack of empathy altogether - psychopaths.



Through the looking glass

Psychopathy is characterised by a lack of theory of mind - an inability to perceive other people's emotions. Unsurprisingly, Keysers and Gazzola were fascinated by this, and keen to study it more, to see if this lack of empathy is reflected in the brain.

The study in question took twenty imprisoned psychopaths and twenty-six controls, in order to ascertain whether the mirror neuron systems differ. Whilst in an fMRI scanner, all the participants partook in three conditions: observation, experience and empathy. In the observation condition, the participants watched two hands interact in four different ways per trial, and each way illustrated a different emotion - love (where one of the hands caressed the other), pain (where one hand hit the other), social exclusion (where one of the hands pushes the other away), and neutral (where one hand touches the other with a non-emotional response). The key aspect in these trials were that the participants did not do anything other than passively watch the videos.



In the experience condition it was more of the same, but this time the participants actually engaged in the four trials, and interacted with the hand of the experimenter. Again, this condition had the same trials as the observation condition (love, pain, neutral and social exclusion), and it was undertaken in the fMRI scanner.

The experimenters isolated the activity seen in both the experience condition and the observation condition, in order to find out how vicarious activation differed between psychopaths and controls. Surprise, surprise, there was a huge difference! The psychopaths had less overlap in known mirror neuron systems for the observation and experience conditions - they empathised less and subsequently 'felt' less, as reflected in the fMRI activation. This can explain a lot about psychopathy in general, such as their lack of regard for the safety of others. But the findings remain predictable.

However, there was a third condition - the empathy condition. Within this condition, the participants were asked to direct their attention towards empathising with the hands that they observed interacting - they watched exactly the same videos as the observation condition, but tried to feel their emotions more. Remarkably, the difference between the two groups mirror neuron systems dropped significantly! By telling the psychopaths to empathise, they subsequently 'felt' more love or pain - which shows that they have the capacity to share others emotions, but they don't automatically do so. The social brain lab still has many more questions to ask, and many more answers. By continually investigating how the brain perceives others emotions, distress and pain, researchers can shed more insight into the fascinating way into which our minds perceive the world differently.

Meffert, H., Gazzola, V., Den Boer, J. A., Bartels, A. A., & Keysers, C. (2013). *Reduced spontaneous but relatively normal deliberate vicarious representations in psychopathy*. *Brain*, 136(8), 2550-2562.



Citizen Science



By Birte Zuidinga

Science and society are closely connected. A large part of science focuses on investigating and solving problems or questions from society. Additionally, most research could not be conducted without funding that ultimately comes from the taxes paid by the community. Therefore, the public deserves to be informed about the endeavors and findings of scientists. But how can this be done? Common examples are writing popular scientific articles, going to (public) conferences, and reaching out to related organizations. However, today I want to talk about a more direct way to involve the public into your research, via 'Citizen science'.

Citizen science can be applied to a very diverse range of research projects. Despite the differences, the common feature is that citizens are actively involved in the scientific process. But what does that mean?

The European Citizen Science Association (ECSA) has formulated a neat list of ten principles of citizen science that makes this clearer (1). For instance, principle 1 states: "Citizen science projects actively involve citizens in scientific endeavor that generates new knowledge or understanding. Citizens may act as contributors, collaborators, or a project leader and have a meaningful role in the project." Also, as stated in principle 3: "Both the professional scientists and the citizen scientists benefit from taking part. Benefits may include the publication of research outputs, learning opportunities, personal enjoyment, social benefits, satisfaction through contributing to scientific evidence e.g. to address local, national and international issues, and through that, the potential to influence policy." It is important to emphasize that citizen science projects should be approached like any other academic research, by considering and controlling for its limitations and biases.

So now we know what the idea behind citizen science is, but how does it really work and for what kinds of projects can it be used? I will illustrate this by presenting some successful examples.

EyeWire

This project was launched in 2012 by the Seung Lab, a computational neuroscience group in Princeton. They use electron microscopy to image very thin slices of the mouse retina. To understand the structure and wiring of neurons better, it is necessary to reconstruct all neurons that pass through these slices. Because of the enormous number of neurons, it would take ages for one researcher to gather a large enough dataset. Therefore, they created EyeWire, an online platform where anyone can help with this task in a game-like setting. Collaborators can scroll through a small block of imaged tissue and need to check and improve the tract that has been identified by an algorithm.

By having five people go over the same block, the real shape of the respective neuron can be identified accurately enough. The project is a great success: the community of participating people keeps growing and several new neuron types have already been identified (2).

Science Gossip

This initiative was started in 2015 by a collaboration between the Arts and Humanities Research Council in the UK and the Missouri Botanical Garden (3). The aim is to annotate the vast amount of illustrations of the natural world that are found in books and publications from the 15th century onwards. Many of those have been made by non-professionals of that time that drew what was around them – the citizen scientists of their time! The Biodiversity Heritage Library has digitized millions of these illustrations. While the images contain a wealth of information about the biological knowledge in that time and how amateurs contributed to that, without proper annotations it is very difficult for historians to find what they are looking for.

Collaborators in the current project will inspect the illustrations, describe what kind of illustration it is, search for a signature of the author, and come up with keywords that belong to the illustration. As of 2017, over 150.000 pages have been completed, something that would have been impossible for several historians to do themselves.

Bash the Bug

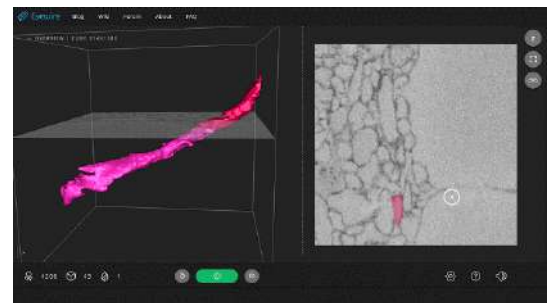
This project started in 2017 by researchers at the John Radcliffe Hospital in Oxford and will run for 5 years (4). The researchers aim to fight antibiotic resistance and tuberculosis by taking samples of patients and growing the bacteria with different antibiotics to see which ones are effective. Of course, the scientists themselves will inspect the plates to see whether the bacteria have grown. However, the contribution of citizen scientists is crucial because the scientist might miss something, and more than 100.000 samples need to be assessed as accurately as possible for a successful project. Therefore, the researchers hope to combine the expert opinion with the crowd opinion of the volunteers to accurately assess each plate. Even though computer algorithms might also work, with these types of data humans are still less likely to make mistakes because of shadows and air bubbles.

Not all projects need citizen scientists to be behind their computer screens all day. A quick search on websites like <https://scistarter.com> (English) and <https://www.iederenwetenschapper.be> (Dutch)

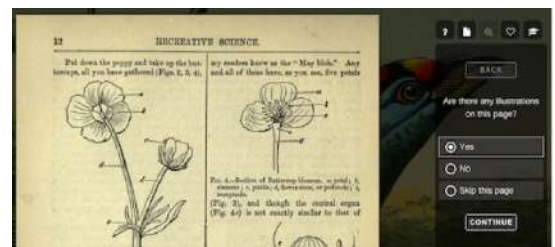
shows topics ranging from baking your own sourdough bread and measuring pH levels to investigate its bacterial properties, identifying the locations of invasive plant and animal species on your way to work, reporting your mosquito bites to let researchers track the mosquito biting activity in time and space, and building your own sensor to measure air quality.

So, it is up to your creativity as a scientist to find the way in which your project can benefit from citizen scientists. Of course, it suits some projects better than others, but I hope to have convinced you that there are many ways in which motivated laymen can be included in science. Even if you will not use citizen science in your research, you can now spend your Sunday afternoons by looking at stars, observing the behavior of chimpanzees, or nosing in other people's donated diaries for science, and who wouldn't want that!

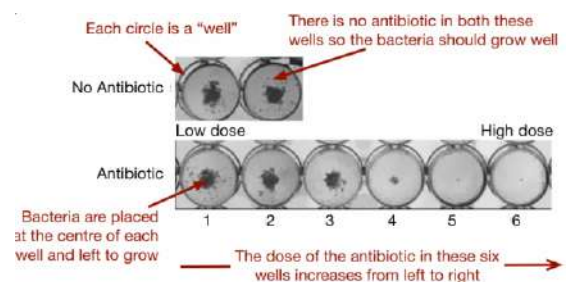
- (1) European Citizen Science Association. *Ten principles of citizen science*. (2015).
- (2) EyeWire | A Game to Crowdsource Brain Mapping. Available at: <https://www.citizen-science.gov/eyewire-brain-mapping/>
- (3) Science Gossip. Available at: <https://www.sciencegossip.org/#/>
- (4) BashTheBug – Help us fight antibiotic resistance! Available at: <http://bashthebug.net/>



EyeWire



Science Gossip



Beat the Bug

Looking for the overheard? Well, you guys didn't say particularly funny things this month... Help us for next month by e-mailing your overheard quotes to newsletter.cognito@gmail.com