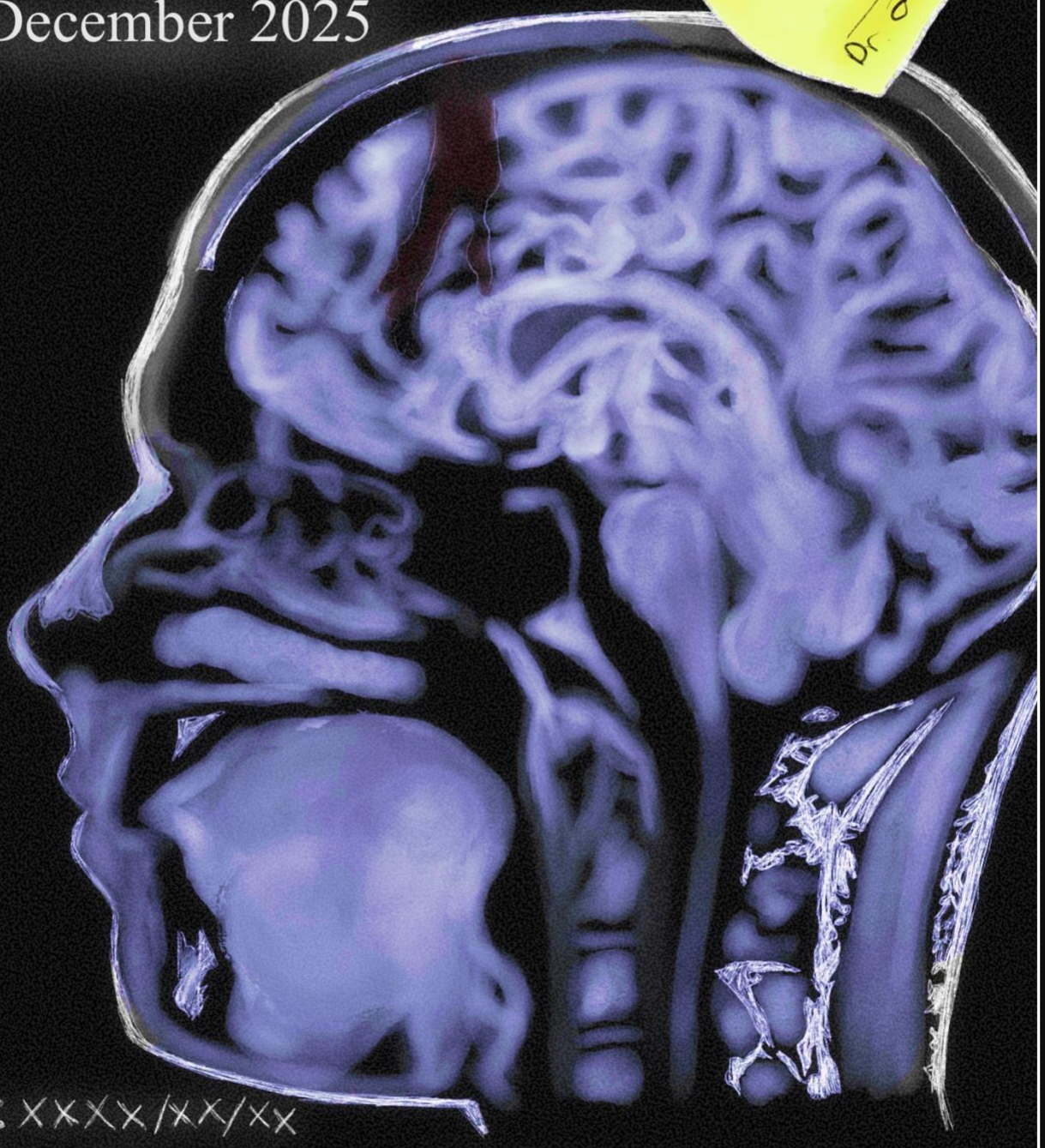
FROM ONE BRAIN TO ANOTHER

> December 2025



DOB: XXXX/XX/XX

PATIENT: JOHN DOE

MRN: XXXX-XXXX-XXXX

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"Have you ever wondered how your brain works? We have, too. We'd like to share some information that may interest you, from our brains to yours!"

Welcome back to "From One Brain to Another": a student-run neuroscience newsletter at York Univeristy, Toronto, Ontario, Canada. This newsletter is dedicated to its curious readers who would like to learn about the intricate, alluring discipline that is neuroscience. Included are student-written research review articles which discuss various topics within neuroscience in narratives reflecting other subjects, such as computer science, biology, and philosophy. We hope you may appreciate how interdisciplinary neuroscience is, and realize that there is room for everyone. With great thanks to the students and staff involved in the developing process, this newsletter also serves as an opportunity for passionate students of all disciplines to obtain research experience and grow into becoming specialists of their fields. Information about programs, such as that of neuroscience, its faculty, ongoing research and opportunities at York University are sprinkled within these pages for the benefit of our audience and future students. **It should be noted that all articles and content contained within this issue are not to be taken as medical advice; the information is collected research communicated by students strictly for educational purposes.**

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January Opportunities, and Events at York University: CIAN, CVR, and the Neuroscience Society.

A Grateful Thank You

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Brain Surgery is made "Easier than curing a toothache" – Transorbital Lobotomies

By: Hana Sopel-Mizrahi

The neurological system and its role in our bodies, behaviour, and experience has long fascinated the human race. One could look back to 640 BCE, a time in which the ancient Assyrians documented their observations of paralysis in lions following spinal cord injury. (Luvizutto et al., 2018). Almost two thousand years later, Santiago Ramón y Cajal proved that the nervous system was not one continuous sheet of tissue, but a system designed from millions of small, microscopic cells called neurons (Barker & Robinson, 2023). Scientists and doctors such as Charles Scott Sherrington and Wilder Penfield made ground-breaking discoveries, revealing knowledge that founds much of what we now know about electrophysiology, -electrical properties from the microscopic scale of our neurons to the macroscopic scale of our bodies- functional neuroanatomy, neurosurgery, and other disciplines. The early half of the 20th century sparked a time of many discoveries. (Penfield & Rasmussen, 1950; Barker & Robinson, 2023)

In 1935, Portuguese neuroscientist António Egas Moniz pioneered a psychosurgical method called the lobotomy. (Faria, 2013) The lobotomy was a procedure in which the white fibre tracts of the frontal lobes of the brain -located directly behind the forehead- were severed using a tool, the leucotome. These white fibre tracts are structural collections of nerve fibres, which connect, and therefore, communicate between one region of the brain to another. They appear white due to the thin layer of fat, myelin, which wraps around them to facilitate speedier signal transmissions (Purves et al., 2018). The purpose of this operation was to relieve psychologically ill patients of their mental ailments. (Terrier, Lévêque, & Amelot, 2019)

Interestingly, Moniz' work was influenced by the discovery made by two American neuroscientists, John Fulton and Carlyle Jacobsen, who experimented on neurotic chimpanzees in the 1930s. They found that, by damaging, or removing the frontal lobes of chimpanzees, it would dramatically change their behaviours and render them no longer aggressive. (Michielsen et al., 2017; Faria, 2013) Similarly, Moniz' technique would damage the nerve fibres connecting the frontal lobes of the brain with the deeper parts of the thalamus and the limbic system- the regions of the brain responsible for information processing, emotions, motivation, memory consolidation, and their effects on behaviour (Purves et al., 2018; Faria, 2013). As a result, his post-lobotomy patients exhibited symptoms such as

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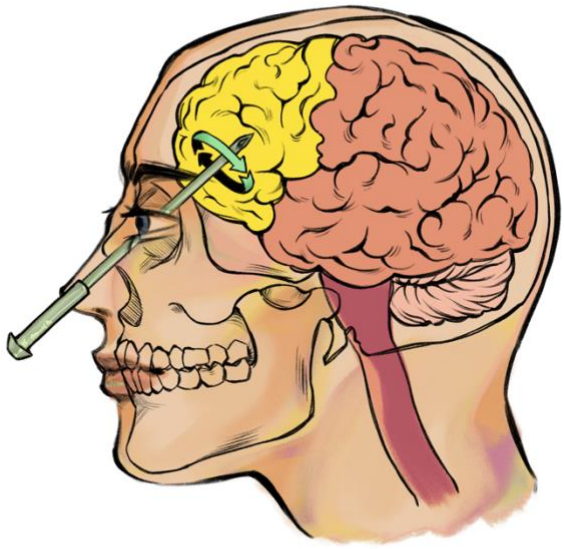
"…distractibility, euphoria, apathy, lack of initiative, lack of restraint, and social disinhibition" (Faria, 2013, p. 5).

American psychiatrist Walter Freeman and neurosurgeon James Watts adopted this technique, performing lobotomies on patients in the USA by 1936. (Faria, 2013) Ten years later, in 1946, Freeman and Watts reported that among 400 patients treated with prefrontal lobotomy, a large proportion experienced relief from the psychological distress associated with their medical or psychiatric conditions (Freeman & Watts, 1946). However, this form of technique was tedious, which required the preparation of the patient and operating room, opening of the skull, using the leucotome to carefully cut the fibre tracts in the frontal portion of the brain, and then closing up and stitching the wound. (National Library of Medicine, 2023)

The leucotome was a metal tool that, once inserted in the brain, had a protraction mechanism that created a circular wire tip that could be rotated manually to cut out the targeted brain tissue. Freeman developed the technique further by adopting a new tool, a house-hold ice pick, and orienting the procedure from a different entry point: the eye socket. The prefrontal lobotomy was thereby renamed the transorbital lobotomy. According to Collins and Stam, (2015), this change in method proved to be quicker and allowed for better access to the frontal fibre tracts in the brain. The procedure could be performed anywhere; it was no longer restricted to the operating room (Terrier, Lévêque, & Amelot, 2019). To operate on unconscious patients outside the operating room, Freeman would apply an electroconvulsive shock. He would then insert the icepick -later named the transorbital leucotome- under the upper eyelid, and, once the tool was properly positioned, he would hit the back of the handle to drive it into the orbital plate of the socket, breaking through (Freeman, 1952). This gave more access to mechanically "sweep through" the fibres, by moving the tool from side to side.



Illustrated by Lana Petros (2025).

Freeman observed from Moniz' post-partem patients that this adapted method was more precise for targeting specific frontal-thalamic tracts. (Faria, 2013) This distinction was important because it guided which fibre tracts would be severed; patients with mood disorders underwent more anteriorly positioned lobotomies (closer to the front of the brain), whereas severely schizophrenic patients received more posteriorly positioned

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lobotomies (closer to the middle and back of the brain) (Faria, 2013).

Cases published in recent decades reveal that lobotomies have caused long-lasting and debilitating effects on patients, such as that of a 79-year-old Japanese woman described by Kumagai et al. (2017). The patient was diagnosed with schizophrenia as a young woman, and, after having been lobotomized, she developed catatonia- a neuropsychiatric disorder that physically manifests in patients as abnormal motor function, often being rigid and immobile in unusual and uncomfortable positions for extended periods of time, mute, along with overly active or agitated behaviours (Kumagai et al, 2017). In addition, the autopsy described by Arai et al. (2001) investigated the long-term consequences of a prefrontal lobotomy performed on a patient with schizophrenia at age 37, 32 years after the procedure. The autopsy findings revealed that extensive damage had taken place due to the lobotomy, and as a result, the brain exhibited severe "white matter degeneration, axonal loss, and gliosis". These are biological processes associated with severe brain damage, and explain the permanent cognitive, behavioural, and functional impairments experienced by the patient. (Arai et al, 2001) To illustrate the emotional and personal impact this procedure had on individuals and their families, Howard Dully shares his story in the memoir, *My Lobotomy* (Dully & Fleming, 2007).

The last lobotomy known to have been performed was in 1967, by Dr. Walter Freeman. His patient, Helen Mortensen, suffered a brain hemorrhage (bleeding inside the skull) immediately after the procedure. Her passing ended Freeman's credibility and medical career. (Caruso & Sheehan, 2017) The lobotomy was one of the first major psychosurgeries known in history. In hindsight, this procedure has taught us much about the importance of the frontal lobes and its associations with the limbic system and other regions of the brain, such as the thalamus. However, due to many ethical issues that arose with the increasing prevalence of this operation, it became a discredited form of psychological treatment. The prefrontal and transorbital lobotomies were being replaced in the early 1950s with alternative forms of treatment, such as antipsychotics and chlorpromazine. Chlorpromazine was used to treat psychosis, a mental condition characterized by a distorted perception of reality, delusional thinking, and hallucinations. (Ramachandraiah et al., 2009; Arciniegas, 2015)

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Graduate Students at York University

Monday, November 17th, 2025.
Interviewed by Jodie; Second Year undergraduate in the Criminology program at York University

Kayla Williams: Masters Student in Clinical Neuropsychology

"Can you tell us what program you are in, and which degree you are pursuing?"

I'm in my second year of my Master's in the Clinical Psychology program at York, with a concentration in Neuropsychology. My supervisor here is Dr. Gary Turner.

"Can you tell us about your academic journey, and what led you to where you are now?"

I did my Bachelor of Arts in psychology at McGill University. I completed that in 2021. And then from there, I was a research assistant for about three and a half years. It was a bit of a longer gap than I expected, but getting into these clinical programs can be pretty competitive. So, the first year that I was a research assistant was in the psychology department at McGill for the Sheldon Memory Lab, and then, after that, I got a position at the Montréal Neurological Institute with Dr. Nathan Spreng. I was a research assistant there for two years. I loved it, that was my first experience with Neuroscience. Prior to then, my research focus had been on memory and the emotional intersections of memory. That was with Dr. Signy Sheldon. But then when I went on with Nathan at the Neurological Institute, I switched gears more to decision making and was helping with projects on that. And how I ended up at York, Nathan is a long-time collaborator of my current supervisor, Gary Turner. So just throughout the years of being there, I got to know Gary (and tried really hard to impress him!). They both knew that I wanted to be in a clinical program, and, you know, that organically led to my position here.

"Have you considered a PhD, or post-doctoral opportunities after this? Has professorship crossed your mind?"

So yeah, the clinical program at York really is considered one program. You do a Masters and then PhD. So, when you're admitted into the Masters at York, it's with the understanding that you continue on into your PhD, in so far there's no major issues, of course. And then, once you graduate with your PhD, you do your year of residency to get your clinical license. Then, after that, you can consider an opportunity either as post-doctoral researcher, if you're interested in becoming a professor, or you can just get right into clinical work under supervised practice at a hospital or in private practice. It kind of depends- you have two options in the clinical program, which is really nice.

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"What could you do in a hospital with your degree afterwards, if you choose to do so?"
That's a great question. I do think a lot of people will mostly think of the medical program when thinking [about clinical practice], and that's a really important distinction to make because you can do your medical degree, and then your residency in psychiatry, and work in a hospital that way. As a clinical psychologist, especially as a neuropsychologist, you would go into a hospital, and you would do a lot of neuropsychological assessments for cases that are having psychological presentations. So, for example, dementias, like Alzheimer's, or frontal temporal dementia. You could work with TBI, like traumatic brain injury cases; you could work with epilepsy cases. That would be at the request of the neurologist on file to get a more complete picture of the cognitive profile of the patient. Neuropsychology is very assessment focused; we try to get a very detailed picture of the patient's neuropsychological function (via psychometric testing) to pinpoint strengths and weaknesses.

"Why would you study clinical neuropsychology? Are there any personal motivations behind this pursuit?"

The personal motivation piece… well, you would want to study clinical psychology- you know, I think it's understanding what it really is, especially as an undergrad in psychology. In psychology, a lot of us think of psychology as just like, therapy. Talking to someone, talking about their daily struggles... but it can be a lot broader than that. To me, clinical psychology has a very strong research focus, and they're really motivated to train clinicians to continue being scientists, you know, contributing to research advancements and our understanding of how normal functioning becomes atypical. If you wanted to work with clinical populations, that's where you'd end up doing the clinical degree. The clinical degree at the doctoral level gives you a lot of freedom to work with, really whatever interests you, so beyond just everyday depression and anxiety, you could work with people with schizophrenia, or on the neuropsychology side, all the cases that I mentioned before, which could be really interesting. My personal motivation to pursue it is just, I've always seen myself doing it. I really like interviewing people, I really like trying to understand where they're coming from, and, seeing a lot of struggle, you know, throughout life, and wanting to help people overcome those struggles in the way that I can, I really find that rewarding. However, when I was in undergrad, and I realized that you need research experience to get into the clinical program, I remember feeling like, really, discouraged, because I thought "there's no way that I would like this, I hate math, I hate stats, this is not for me." But I ended up really, really, really loving the research process. I was really lucky to have a good mentor in Signy – she taught me a lot in the way of research. That also solidified my pursuit of this degree, because it really is a research degree. You are expected to maintain the same research productivity as people in the nonclinical program.

"When you felt that discouragement, would you describe that feeling as having been influenced by internal or external factors?"

That's a great question, and a really great distinction to make. I think, when I was first emailing any and every prof, just trying to get my foot in the door, I was feeling discouraged internally, because I had these preexisting ideas in my mind that this is something that I probably won't be good at, given what my interests are. So, I was kind of underselling myself a little bit, but I also was trying to go into it, giving it my best effort. I thought I owed it to myself, that's something I

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worked really hard on pursuing, so before I change career paths, let me just try it and see if I like it. But it is interesting to make that distinction because I think along the way- I've been in research now for quite a long time, because I started in my first lab back in 2018- it can come with a lot of bumps along the way. At this stage, usually students have not yet experienced academic rejection, and things like that. That really comes into play when you start the research experience, whether it's getting rejected for a funding opportunity, or getting your manuscript rejected from the first journal that you submit to, and also, even if it's not rejected, getting interesting reviewer comments on your writing. Your manuscript can be jarring, the first time you ever experience that. Research really does become- especially when you want to do high level research in a really competitive field like neuroscience- it's certainly competitive. That can be more of an external discouragement, so that's where it's important to have the right supervisor who can encourage you along the way.

"What kind of ongoing research are you conducting, and do you have any studies that need participants?"

Yes, we're looking for volunteers, so any word of mouth helps. What we're doing in our lab right now, we're conducting a really large-scale study. That's actually happening across two different sites in Canada, so here in Toronto, and as well in Montréal, with Nathan Spreng's lab. This is a study on how decision-making changes across the adult lifespan. We are looking for two groups of people, young adults -although we typically do get them through URPP- more specifically, older adults, anyone aged 60 or older, to come in and complete our study. What they would do is a pretty big battery of computer-based decision-making games that assess this, explore-exploit mode of thinking. That just really measures our tendency to choose between something that we're familiar with versus something that we're less familiar with. Then, they would also complete some neuropsychological assessments as well.

"Do you have any advice for students who are taking a similar path as you? Is there anything you wish you had known when you started your undergraduate studies?"

Yes. To answer the second part first, I think as an undergrad I really didn't have- and this is geared for people interested in clinical work- but I really didn't have a clear idea of what clinical psychology was- and definitely not clinical neuropsychology- so my advice there to undergrads is to take some time to read into what clinical psychology is, because, like I said, my discouragement as an undergrad came from the realization that it really is a research heavy field, and I think that a lot of undergrads at that stage prefer to go a more counselling route to do psychotherapy. That would be a critical distinction to make early on so that you're not getting too attached down a path, because getting into a clinical psychology program is a very specific (and long) path that you have to take. That can be really rewarding, but also really tiring, if it's not the right fit for you.

The first part of your question; don't give up if you know it's something that you do want. It is becoming the norm that the average age of entry into these programs are increasing, and it's a six-year program. It's long, and it's a commitment, but it doesn't mean that if you're not getting accepted straight out of undergrad that you're not meant to be in the field and you're not going to get in. It's probably just a signal that you need to amp-up your CV a little bit more. Like I said, it's research heavy, so get involved in research as early as possible, and not just the research

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methods course at York. That won't be enough. You need to take on an undergraduate project (like an IRP), you need to really get your hands dirty with data collection, participant recruitment, data analysis, putting together a poster at a conference. It also really helps prepare you for graduate-level work. And learn how to code! Back when I was in undergrad, coding was really not a thing in psychology. Even the stats courses we took, we were learning SPSS. I hear now that undergrads learn R in their undergraduate stats courses, which is great, because that's what we use now. But, if you're not, for whatever reason, do now, because it will save you a lot of headaches that I had to endure.
Last piece of advice is to network, network, NETWORK! Building relationships is so important in this field (and more generally in life!). Starting earlier on gives you more time to cultivate more meaningful relationships with the right people. Go to your lab socials, talk to new students, and try to balance a diverse experience with a meaningful experience. I think sometimes undergrads are focused on getting into as many labs as possible to show that they have a range of experiences. The limitation to this is that you don't really get the opportunity to establish meaningful relationships with anyone in any one lab, and that will be reflected on your reference letter.

"In what types of research did you get involved during your undergraduate career?"

I've heard the process is a little different at York, but I ended up doing three research projects in the memory field. I did my first project in my third year of undergrad, and that, if I remember, was looking at emotional queuing of autobiographical memory looking at emotional queuing of autobiographical memory (Sheldon et al., 2020). That was just a study where we did the Autobiographical Interview, and we would have these emotion words, like, "think of a time that you were happy versus distraught, versus, you know, x, y, z." And people would give these really detailed memories for us. We were able to look at the access of their memory as well as the elaboration of their memory, to then answer the question, if the valence and the intensity of emotional cues can affect either access or elaboration. Valence and intensity of an emotion, those refer to two dimensions of emotion. Valence would be whether it's positive or negative, and intensity would be whether it's high or low. For example, a positive emotion with high arousal, or intensity, would be excitement, versus a positive emotion with low intensity would be, maybe, contentment. Same thing with negative, so you could be really angry, which would be higher intense emotion, or you could just be sad, which is a lower intense emotion. Intense just in terms of the arousal of your body. So, we wanted to answer that question.

That led into my last research project, and I'll just skip over my second one for a moment. I was more so interested in looking at depression, because it was in line with this emotional-memory theme. So, we know that in depression, our memories are over-generalized and negative. So, we tend to think of our lives as always bad, and we really struggle to access more positive events in our lives. That's a hypothesis that some researchers have about the maintenance of depression. I did a study more on that front, we were looking at autobiographical future thinking (Williams et al., 2022)- so having people imagining their personal futures in hypothetical scenarios, and again, manipulating both the valence and the intensity of emotion cues that we used for the hypothetical scenarios.

My second one, which was basically my thesis for my undergrad, that would be equivalent to an IRP at York. That was an aging study as well, so it was my first experience with aging research.

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So, we looked at three different conditions, where people recalled their past memories. Then we had people do another control condition, and the condition of interest for us was an open-ended task where we essentially just said, "think or do or say whatever you want." There was some aging hypothesis that we had there that were confirmed in that study. I did that in 2018, so it's been a while.

"In follow up to that, is your approach with writing your undergraduate thesis… has that differed from your current experience of writing your manuscript?"

Yes, that was a really different experience. The thesis is more academic, and, in the opening of your thesis, when you're motivating your study, you really want to draw on the literature a lot more to show that you've done your due diligence and you've done your scholarly work in whatever field of study that you are in. So, knowing the history of the literature is going to be important to show an academic document. In a manuscript, it's like, "get to the point." You typically are doing it in so many pages, and the motivation of the study- you don't want to assume that the reader is going to know what you're talking about- you've got to define all the right things. But you don't need to go into the history of the literature that you are working in, in a manuscript. A manuscript, it's a much more polished version of what your thesis would ever be. That thesis I did on the aging study in my undergrad, that was the first draft, in a way, of the manuscript. If you read the thesis and then you read the manuscript, it's like, you wouldn't even think it's the same thing. Just because the aims and motivations of each document are different, I think it's really, really great, if an undergrad ever has an opportunity to get on a manuscript. If you do, even as a co-author, you know, ask your supervisor to get involved in the writing process, so that you can learn a little bit more about what that's like. Also ask -this would be another piece of advice- to be a part of the review process. Essentially, with that, you submit to a journal. If they like it, they send it out to two or three reviewers for feedback. Then the reviewers send you back some really interesting comments on your work that you have to respond to, to get to the next stage of publication. And that, I think, is a really important learning curve. To not only defend your work, but how to communicate that in a way that is still collaborative but not really defensive. I think it's a really interesting experience to gain in your undergrad.

"Would you say it's an argumentative field, if you need to defend your thesis?"

Yes, I would say academia is just an argumentative field, but argumentative, for the sake of trying to get to the same place. We all just want to get to the truth; we all just want to find out what's really going on. But there's so much debate that goes on. Especially, you know, McGill is a very research-oriented university. Even just my classes, outside of research, like my seminar classes. They were mostly like- the prof would barely talk, like it would just be the students going at it, debating on whatever topic it is we're talking about. I think that prepared me nicely for watching researchers, kind of go at it with each other. I always find it funny, hearing scientific arguments, because at the end of it, it sounds pretty heated, but then they're going to go for a drink together. It's an argumentative field, but it's for a good purpose. It's never to cut someone down. It's a constructively argumentative environment.

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Kayla's Literature

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2. **Williams, K.,** Snytte, J., & Sheldon, S. (2022). Individual differences in depression are reflected in negative self-evaluations when imagining future events. *Journal of Behavioral and Cognitive Therapy*, *32*(3), 207-221.
3. Strikwerda-Brown, C., **Williams, K.,** Lévesque, M., Brambati, S., & Sheldon, S. (2021). What are your thoughts? Exploring age-related changes in episodic and semantic autobiographical content on an open-ended retrieval task. *Memory*, *29*(10), 1375-1383.
4. Sheldon, S., **Williams, K.,** Harrington, S., & Otto, A. R. (2020). *Emotional cue effects on accessing and elaborating upon autobiographical memories. Cognition, 198, Article 104217*.

Kayla's Current Research at York University is looking for participants!

"We are interested in studying the cognitive and affective mechanisms that impact decision making across the adult lifespan. We are looking for healthy adults aged 60+ to participate in our study.

This study involves two sessions (separated by 3-4 months) that last approximately **4-hours** each, during which you will be playing some computer-based decision-making games and completing some neuropsychological assessments. There will be multiple opportunities for breaks, and we will provide coffee/tea and snacks throughout. You will receive **$60** as compensation for each session ($120 in total) and we provide free parking if needed.

If you are interested in participating, please contact the CNN lab at: cnnlab.york@gmail.com"

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PARTICIPANTS NEEDED

FOR A STUDY ON AGING AND BRAIN HEALTH

The **Cognitive Neuroscience and Neuro-intervention lab** at York University is seeking participants for a research study on decision-making and brain changes as we age!

STUDY REQUIREMENTS

The study will involve **two in-person sessions**. You'll complete a series of computer games and neuro-psychological assessments.

ELIGIBILITY

- Over the age of **60**
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Compensation will be provided for **each visit**, as well as for your **transportation costs**.

Location

Cognitive Neuroscience and Neuro-intervention Lab
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Neuroscience Professors at York University

Thursday, November 13th, 2025.
Interviewed by: Hana Sopel-Mizrahi

Dr. Jonathan Michaels, Assistant Professor: Department of Kinesiology and Health Science.

(Photographed by Denz Marieon Pasion, 2025)

"What did your academic journey look like, and what, in particular, led you to professorship? Why did you choose neuroscience?"

I almost didn't choose neuroscience; I mean, I think, until I was in mid-undergrad, or late undergrad, I wasn't really considering the academic pathway. I did work in a psychology lab in my second year as an undergraduate student. I don't remember what got into my head that I wanted to do it, but I applied, and we were doing stuff- some of those things which were quite scary to me. One of the first things I had to do was call people and ask them to put their kids in the studies- this was a child psychology lab. This was very difficult for me: I still don't like talking on the phone. But other parts were, you know, we were also coding how to process eye tracking data for the kids that came in. I wasn't really sure if I wanted to do stuff like that, long term, but it was only towards the end of undergraduate studies I worked in 2 other labs: a motor control lab, and a memory lab studying rodents. At the end of my undergrad, ***I was actually thinking that I would***

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become a musician *because I started studying cello and I was taking a performance course, what all the music students take.*

I was thinking about doing that instead of anything else. So, ***I was not saying, 'okay, I know what I want to do, I'm going to be a neuroscientist or an academic.'*** *It was only really talking to my parents who were not super enthusiastic about a music career. They were saying, 'well, you know, you're doing all this neuroscience stuff, don't you want to do- maybe you could do a PhD, or a master's and then keep going. It hadn't actually been on my mind until those last couple years of undergraduate study. When I started looking into it, I said 'okay,* ***well, what are the things in neuroscience that are actually interesting?*** *Let's think about, regardless of what I did in my undergraduate work,* ***what is out there that I find interesting.*** *' And so,* ***I looked at a few review papers*** *on brain computer interfaces that were around at the time, and I found that really interesting.*

So, I just went through the papers, looked at specific references, looked at the names of the people in the references, either the 1st author or the last author, and ***started googling those people****. I would say this would have been in 2010. That's when I was looking. And then I started thinking, 'okay, this could be really interesting.'* ***I started reaching out to some of those people by email****, which was, luckily, a thing- some people had no online presence, especially those [who were older/with more years of experience]. They didn't have much online or they had some website that was not updated. Some people had more information and seemed like there was more going on, and I was definitely interested in those labs.*

I reached out to a bunch of people. I got some good responses*, but in the US, most of the programs work like this: you get into the program, and then, you don't choose a supervisor right away. You do a couple years of courses and maybe some rotations- and then you find a supervisor. Most of them were like, 'sounds good, let me know if you apply to the program.' That's not the case in Canada. In most programs, you should have a supervisor when you apply. That's also true in Europe and many other places. So, I decided to apply. I applied to a bunch of places in the US and got rejected from all of those. My grades weren't bad, but they weren't like absolutely on the top. I don't remember what my grades were like, but I'm guessing probably like a low A or something, like 82 or 83 overall, which is fine, but for a lot of these programs, they're looking for something else. It has changed now also, I think, in terms of how they evaluate you, but maybe not for the better.*

I think it's actually gotten harder. But I still got rejected from all of them at the time. This is the process of how I got into it. In the end, I also reached out to 1 or 2 people in Canada and someone in Germany. That's where the process was different. ***It wasn't about just getting into university; it was much more personal; that's where I got the best responses.*** *The person I talked to in Canada ended up not having space for anyone, so that didn't go anywhere. But the person I talked to in Germany was very interested, and* ***he literally flew me out to Germany for an interview****. This was during my fourth year of undergrad, which seemed completely normal, because the graduate programs in the US, if you get through those stages, they have an on-site interview process. This was a really personalized one because it was just between us.* ***It wasn't for a program; it was just to work in their lab****. So, they flew me out to Germany, and that was all really good, and* ***I was so interested in that****; they offered me the job. Saying now on the record, I did not have any other offers: that was the only offer I had.*

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So, at that point, it was between not going to graduate school that year, or taking that offer, which I was very excited about. But it was the only one I had. So, ***if I had not explored that option,*** *it would have been a very sad experience getting rejected from all the universities in the US. I wasn't as focused as I should have been with it, I was a bit more like, "well this is a really fancy school, it sounds really good. So, I should probably go there and then I'll learn something, and it'll be good." Which I'm sure would have also been true. But it wasn't a very focused approach. That's why I got into it; I went straight into a PhD program- which normally isn't allowed in Canada and Germany, but, because I ended up having a paper as an undergraduate published from some work that I did, we could say, "Hey, isn't this kind of like a master's degree?" So****, I just skipped the master's entirely****, which I also didn't recognize at the time to be special or unusual. I jumped right into it; I started working right away.*

"In your undergraduate studies, were you in a neuroscience program?"

I wasn't- I actually started undergrad in the physics program. I was at Queens, so they don't make you choose a program in the first year, in your second year you enter a program. But I was basically in physics. At the end of that year, I chose the math program, actually, but I wasn't really wanting to do that. But I had taken, in that first year, cognitive science: there was a first-year cognitive science course. Queens actually has a cognitive science undergraduate program, which is incredibly unique. It's like their own faculty- which I didn't know anything about before I took this class. I read the description of the course, and I said, "oh, they're going to talk about how the brain does stuff," okay, I didn't even know that was a thing- I didn't know anything about the brain, nothing. I couldn't tell you white matter from gray matter, but that sounded interesting. When I did the course, I really liked it. I thought about doing the cognitive science program, but that would have meant changing faculties, and it was a very intensive and specific program. For whatever reason, I still wanted to keep things a little bit general. I still wanted to be able to take physics courses, math courses, or computer science, like different things.

The program that fit that best was psychology. With psychology, it was quite free. It wasn't a specialization. You had a few things you had to do, but then ***there was a lot of freedom in the courses.*** *For that reason, and the reason that psychology is quite related to cognitive science, I decided to do the psychology program. I hadn't taken psychology, so that summer, I took the first-year introductory psychology course over the summer, and then applied to the psychology program, which, normally, they wouldn't let you in at that point, because they've already admitted everyone. But because I had emailed someone in February, and asked, if I take psychology in the summer, can I still get in? And somebody had said yes, and when I confronted them with that in July, and said "you said that I could do this." They said "oh, that's not really fair, so what we're going to do is open up a few more spots, and you will compete. We have to do it fairly, we can't just admit you personally, so we'll open 5 spots, we'll tell everyone, and then you can apply. If your grades are high enough, then you'll get in."*
I knew that to do that, they really try to weed people out in those first- year courses, so it's quite hard to get a good grade in them. But I did it over the summer, and I was working on it every day. I think I managed a 96 or something, which was good enough to get into the psychology program. Then I did the psychology program. There was a neuroscience-like program, which was more like

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a pre-med program. I wasn't on that path because I had done physics. I still ended up taking a third-year neuroscience course, so I could do a bit of everything.

I mention specifically that these little things that could have worked out differently. *Like, for example, being able to get into the psychology program, that was basically because of an email that I had that* ***they also didn't even have to honour, but they did.*** *I definitely recognize there's a lot of things, and not just my decisions, but little things that are completely out of my, actually, most of which are out of my control.*

"What specifically led you to professorship?"

I did my PhD, which, you know, took a while, but I really liked it. *I mean, that also could have gone a different way.* ***There were challenges, but I just liked the whole process of it,*** *which was very different than what undergrad had been like. It was much more self-directed. Like, every day, was like, you know****, what should I be doing to further my research, further my knowledge?*** *Like, what should I be exploring? And I really liked that freedom. Which, I know, some people- many people do a PhD, and then they finish their PhD, and then they say, "I'm never doing that again, because it's just too open-ended."* ***You don't get a lot of feedback*** *about whether you're doing the right thing or not, and everything takes a very long time. So, from day to day, month to month, even from year to year, you might not be getting much feedback. But I didn't really mind that so much because* ***I could just focus on what I found fulfilling on a day-to-day basis: that self-directed nature.*** *So, when I got to the end of the PhD, I definitely thought, okay, I definitely want to do more of this. I was obviously thinking, "oh, I could become a professor eventually," but I was just thinking like, "okay,* ***I know enough to say, I think I want to keep doing this*** *and continue on that path,* ***knowing that there's a lot of steps and things that might go wrong.****" I had been reading a lot of papers from 1 or 2 particular labs, so I reached out to that person, specifically* ***Krishna Shenoy, who was one of the pioneers of brain computer interfaces.*** *He died in 2023.* ***Mentorship was very important to him****, and so he was someone that I'd already, you know, when I read review papers back in undergrad, I'd already read his name.*

I had already contacted him, and he had responded very nicely and said "yes, apply to the Stanford neuroscience PhD program." which, of course, I didn't get into as I had mentioned. But I knew who he was, and we'd actually had a few interactions. My PhD supervisor was nice enough, because they were at one point together in the same postdoc lab, which was at Caltech working with Richard Anderson, who does computer-brain interfaces. They happened to overlap a little bit there, so they knew each other, and my PhD supervisor asked Krishna Shenoy to be the external evaluator for my thesis. When you do that, you bring someone in to read your thesis, who's not been part of the work, and they give an evaluation. Sometimes they attend the defence, sometimes they don't. In his case, he just had to read it and make an evaluation. I think that was also very valuable because it meant he had to look through all the word I had done and see what he thought about, whether he thought I did something good. So, when I contacted him to say I am looking for post-docs, he knew very well who I was and had a good opinion of me, I guess. And so same deal, we talked, he brought me out to come visit.

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I really wanted to go, because that was one of the best places in the world for that kind of research. ***So, I felt like I was "getting into the club".*** *The club that I read on paper, however many years ago-* ***I worked my way in****; it actually worked out.*

> "One thing that I've taken away from that in general, is that people who are doing the work and the things you're interested in, they may not be as far away and as inaccessible as you think. They seem like they're way up there, doing stuff, and there's no way you could ever talk to them or work with them. But if you want to focus on that, that's the path you're on, to be one of those people, or at least be in that zone."

*So, in my case, seeing those people, being like, "****wow, that's what they're doing, I could actually work my way up to it.*** *It did take a number of years, but it's not as crazy as it seems. Once I was there, then I was like, "okay, I need to figure out how to get a professorship job." That's when it became a more, I would say, real and difficult because you realize how hard it is to get such a job and, you really have to be doing all the right things- at least, in your mind- all the right things, like in publishing the right papers, I need to know the right people, have all the right ideas. So, then I started thinking more about that. As I mentioned, at the time, he [Shenoy] did end up shutting down the part of the lab that I was working in because he got sicker. He had already been sick actually about 7-8 years before with pancreatic cancer, but he beat the cancer at the time, which was crazy. There's a whole story you could tell about that. But then he started getting sicker around this time, and so he shut down that part of the lab, and I ended up having to switch post-docs. I went to Western University after that, and then stayed there until I came here, which was also for quite a while.* ***It didn't work out as I had expected,*** *again,* ***for things completely out of my control, but I still met all the people there and I'm still very connected to people from that****. It was a very important step. But then, when I did my second post-doc, I was very much thinking about, what I need to do to be competitive, to get such a job.*

"To clarify, when you say a second post-doc, do you mean the PhD degree?"

No. When you're done the PhD and you get your doctorate, then normally people do a post-doctorate, which is literally just a second job after your PhD. You could do another PhD, but if you're staying in that general thing, you're typically not yet ready to be a professor. In some fields, I think in some of the liberal art fields, people go straight from a PhD to professorship, but, in science fields, it's quite unusual. You have to go and do more with different people and in different places. That's another thing. You have to ***expand your skills and network****. After you're done, let's say, one post-doc, normally, then you can apply for- and it might be a year or two years later. In my case, it was quite a few years later, I mean, because I had to switch, and the work I was doing also takes more time, but it's like a few more years before then you can apply for these jobs.*

"For students who are interested, what kind of research do you do now at York University?"

In the same theme as one of the things I did in undergrad, right, which was working on, like, motor control, the lab now focuses on not just motor control, but understanding how the brain controls the body and learns to control the body, for kind of complex and flexible skills that especially, primates have, like us, using our hands. Complex hand movements, complex reaching

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movements, learning to do, how do we learn to do all those things, how are they actually controlled in the first place? How do the muscles coordinate? How does the brain do that? Understanding that from the systems level, meaning, if we look at the lots of neurons in the brain, different parts of the brain, how are those things coordinating at a high level to make this whole process happen, right? So not just, "let's look at one neuron and be like, well, what's happening on that one neuron, but, like, how do all these things work together to create the behaviour?" That's what's called ***systems neuroscience****: when you're looking at how a bunch of different components work together to create the higher-level thing. So, we can go all the way. We're not just interested in zooming in, but we want to then back out and say, "when I'm playing piano, how is that even possible? How is that working? How did I learn how to do that? How is that affected by all these different things? So, we study that from all these different levels, then.*

We study it by just looking at human behaviour, human kinematics, human muscle activity, human learning, but also from the electrophysiological level, so from the neural population level. So how do we look at what many neurons are doing during these tasks- that's why we use non-human primates for that, is to say, "okay, we can look at a similar animal that can do all kinds of complicated things and has similar type of some similar capabilities, how are the neurons in their brain coordinating those things? Can we learn about how humans are doing it from that?" And then looking at the, from a modelling point of view, say if we build neural networks that can do some of these things and can learn some of these things, can that help us understand how the monkeys and the humans are also doing that. So, we cover all of that. I named the ***lab Neural Control and Computation*** *to cover the motor control, how neural systems work together, and then the computation part.*

"You are in the process of getting an article on the Nature journal. How are you feeling about that? How long have you been working on this? It's exciting!"

That's already published; there was a York news article about that, which you can probably find very easily. That was about two weeks ago, it came out October 29th. It is a really good example of what we're going to be trying to do in the lab, in terms of the approach. This was something that I was working on primarily during my second post-doc when I was at Western University. I continued to work on it a bit after I came here. But the main experiments we did at Western involved human behavioural and muscle recording experiments. So, with normal human subjects, it involved monkey electrophysiology, recording from neurons, and it also involved simulations of arm control. The paper has all of these, which I think is a powerful approach to make these connections between what the brain is doing, what models say makes sense, and what humans are actually doing. We have to make sure that we're grounding it in behaviour that humans actually do it. And that's where we started with that, is we were looking at "is the thing we're interested in, something that humans actually do." That whole process takes a very long time.

So, the idea for that particular project, which is about sensory expectations, or, what we call sensory expectations- predicting things that might happen to you in your environment. The original idea I had for that was probably in 2017, something like that, it was part of some fellowship applications I wrote when I was at Stanford. I didn't get to do the experiments there because it didn't work out and then started doing that at Western and then those took years and then, you know, getting all the results, writing the paper, trying to publish the paper. And actually,

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the publishing part actually went quite fast for such a thing. So, just to give a sense of the time scales involved- not that I wasn't doing other stuff at the same time, but these kinds of projects can take like 5 years, I would say, something like that. And this one, technically, I started doing the actual human experiments, with an undergrad. We made it his undergrad thesis at Western, and that was in 2019. So, the human data for the paper that just came out in 2025 was collected in 2019. For a purely human study, like, if we had just done the human work and then we're done with it, it wouldn't have taken us until 2025 to publish it. But for such long studies with multiple experiments, it's not unusual for it to take 5 years.

"So, you're definitely going to need persistence if you're going to pursue research."

Yes, absolutely. That's why I think it's not a good fit for a lot of people- not because they're not smart or capable, but ***you really have to enjoy the journey part of it, because it gets difficult****. It sometimes gets hard to see how you're going to get out of it. So, for me, it was really helpful that I just enjoy these long-time scale things, where we're thinking about a question for a long time.* ***It's not that we're going to get an answer today or tomorrow, it's really like a slow burn.*** *And that's okay with me****. I like to be very kind of slow and thoughtful about things.***

If a question isn't worth thinking about for maybe years, then maybe it's not the right question for me, right?

"Would your lab be open to accepting any volunteers, whether they would be undergraduates or capstone research students this year or next?"

Yes and no, right? So, this year, we actually were quite ambitious. We have four undergraduate thesis students, two in the kinesiology program, and two with the neuroscience capstone. I had not anticipated taking so many, but it just kind of happened in a bunch of different ways. For that reason, I haven't really been taking volunteers now. I wouldn't say it's a hard no, but I've been trying to keep it down also because if somebody's volunteering, they like it, and they stay there, I want to also have the opportunity for them to say maybe next year they want to do a capstone or something. To make sure that they would have the option, right now, if we make too many promises, then it's harder to give everyone that opportunity. So, I'm trying to slow down a little bit, but there definitely will be, you know- I took four this year. ***There'll definitely be some opportunities next fall for the capstone and things like that.*** *But I'm trying not to make too many commitments.*
"So, perhaps it would be fair to say it wouldn't hurt to ask, but definitely keep your options open as a student looking for a capstone opportunity?"

Yes, and it's definitely good to talk to people in advance. *I had a lot of people ask me in January of this year about the Capstone, and I was like, I'm not sure yet. But I think definitely if people can find the lab that they, if they can spend some time in it, volunteering or, obviously like a summer project would be great, but it's not always possible.* ***Basically, take any opportunity that you can get and it's okay to then do something else after it, right?*** *I was volunteering at one lab, and then I ended up getting a summer job in another lab, which was the motor control one, and then I ended up doing my undergrad theses in the rodent memory lab. So, it was kind of all over the place.*

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November Neuroscience Events at York University

CVR Seminars: Dr. Doug Crawford

Friday, November 7th, 2025.
By Valentina Dodaro

Photo Credit: Denz Marieon Pasion

The first CVR seminar of November welcomes Dr. Doug Crawford. The founder of the York Graduate Neuroscience Diploma Program and the current holder of the Distinguished Research Professorship in Neuroscience and Research Chair in Visuomotor Neuroscience.

The human brain uses different spatial reference frames to guide goal-directed movements. These frames can be divided into egocentric cues, target relative to one's own body (the chair is to my left), or allocentric cues, which define target location relative to external landmarks in the environment (the chair is text to the table).

Classic neuropsychological research has shown that these two types of spatial information are processed in partly separate visual pathways, the dorsal stream supporting egocentric cues and the ventral stream supporting allocentric cues.

Neuroimaging and neurophysiology experiments have further suggested that this spatial coding does not remain completely isolated but converges in the parieto-frontal cortex, where visual information is transformed into motor commands that guide reaching movements. The human brain uses different spatial reference frames to guide goal-directed movements. These frames can be divided into egocentric cues, target relative to one's own body (the chair is to my left), or allocentric cues, which define target location relative to external landmarks in the environment (the chair is text to the table). Classic neuropsychological research has shown that these two types of spatial information are processed in partly separate visual pathways, the dorsal stream supporting egocentric cues and the ventral stream supporting allocentric cues. Neuroimaging and neurophysiology experiments have further suggested that this spatial coding does not remain completely isolated but converges in the parieto-frontal cortex, where visual information is transformed into motor commands that guide reaching movements.

Dr. Crawford focused on a recent series of experiments where allocentric reaches have lower reaction times and better accuracy than purely egocentric reaches. These results suggest that allocentric cues provide the brain with a strong and reliable source of spatial information that we

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are able to turn into quickly initiated movement. Neuroimaging data further revealed that landmark-centered reaching increases information sharing between the ventral and dorsal visual streams. This indicates active rather than isolated communication between egocentric and allocentric systems during movement planning.

To further distinguish between the role and integrative process of the two streams Crawford introduced data using transcranial magnetic stimulation (TMS). Experiments using TMS showed a functional dissociation between the two streams. TMS stimulation over ventral network hubs specifically affects allocentric reaches, whereas stimulation of dorsal hubs affects both types of reaching. This data supports the idea that the parietal-frontal cortex is responsible for a central egocentric transformation that can be flexibly enhanced by integrating allocentric signals coming from the ventral visual stream.

Overall Dr. Crawford's seminar presentation concluded that although the parietal-frontal cortex uses a predominantly egocentric specific framework to guide motion, allocentric data can be incorporated to improve the efficiency and precision of actions, particularly in complex, landmark-rich settings.

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November Neuroscience Events at York University

CVR Seminars: Dr. Dejan Todorović

Friday, November 14th, 2025.
By Valentina Dodaro

Contributing to the weekly CVR seminars taking place in November is Dr. Dejan Todorović. Dr. Todorović obtained a BSc in mathematics from the University of Belgrade, Serbia, and a PhD in psychology from the University of Connecticut, USA. Focused on visual perception, combining experimental methods, mathematical analysis, and computational modeling. His research spans perception of light, linear perspective, and visual illusions, with a particular focus on how early visual mechanisms generate perceptual interpretations.

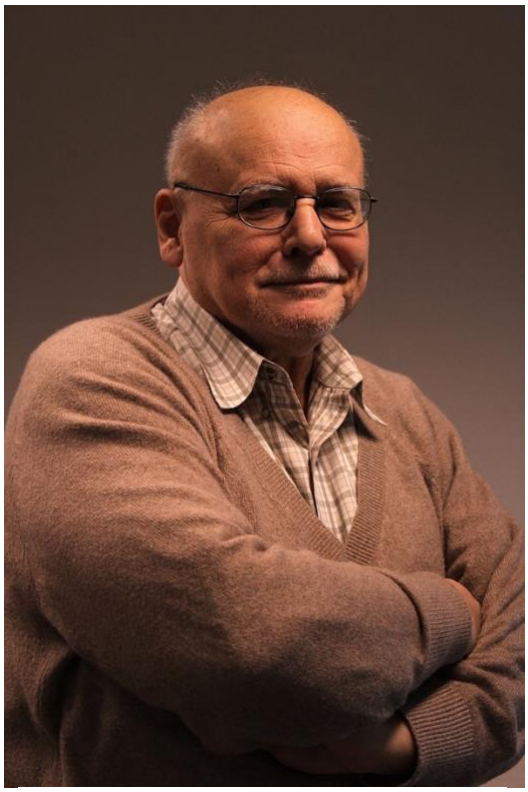
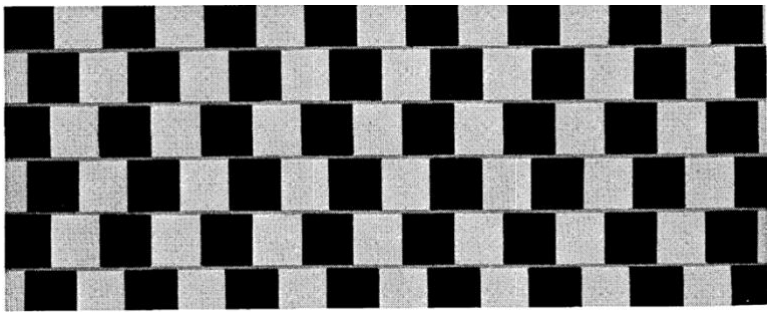


Photo Credit: Denz Marieon Pasion

The second CVR seminar of November discusses an elusive topic, one where our brains misinterpret sensory information leading to a misperception of reality. Visual illusions remind us that although our perception is very often accurate it can be manipulated using certain stimuli, causing the brain to incorrectly interpret reality. These illusions are composed of lines, edges and the specific arrangement of light and dark components of an image. Dr. Dejan Todorović studies how we see the orientation of these lines and edges. His talk focused on a group of visual illusions where the perceived direction of lines changes depending on how the light or dark parts of the picture are arranged.



Café Wall illusion

A well-known example of this group of visual illusions is the Café Wall illusion. To explain these illusions Dr. Todorović uses a computer model based on the mechanics of early visual areas in the brain, especially V1.

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The model receives images that are processed by a set of filters mimicking the response of neurons specialized for processing edges and orientations. The computer processes images in the same way as early neurons. Todorovic's model outputs special patterns of activity called “oblique clusters”, which are present only in the case of an illusory image. Oblique clusters would not appear in the case of a control image. This pattern of activity suggests that illusion happens when certain combinations of light and dark areas trigger specific patterns across many neurons, rather than activating just one type of neuron tuned to a specific angle. The development of these models and the collection of this data continues to solidify its importance in our understanding of visual perception. Dr. Todorovic’s work continues to expand our understanding of perception and the circumstances which shape the complex relationship between visual input and conscious experience.

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November Neuroscience Events at York University

CVR Seminars: Dr. Saad Idrees and Dr. Jiali Song

Friday, November 21st, 2025.
By Valentina Dodaro

Photo Credit: Denz Marieon Pasion

November 21st was an exciting day at York University's CVR, featuring not one, but two distinguished speakers. Dr. Saad Idrees is a research scientist in the Zylberberg lab at York University. He received his PhD in Neuroscience at International Max Planck Research School in Tuebingen, Germany. Dr. Jiali Song is a Post-Doctoral Fellow in the Applied Perception and Psychophysics Laboratory (APPLY Lab) at the University of Toronto Mississauga. She received her Ph.D. from the Department of Psychology, Neuroscience & Behaviour at McMaster University.

The first speaker of the afternoon was Dr. Idrees. He is currently developing neuro-ML models of the retina by integrating neural biophysics within artificial neural networks and employing those models to explore visual processing under dynamic conditions of natural vision.

Dr. Idrees' section of the seminar highlighted the goals and progress of the Digital Retina Project. The goal of this innovative project is to build a computer simulation of the human retina that predicts optic-nerve activity from visual input. This type of digital model has the potential to be impactful in both vision science and medical fields. By providing camera-to-retina interface for vision restoration, enabling targeted diagnostics for retinal diseases, and offering a platform for testing hypotheses about retinal processing in a controlled, digital environment.

The current digital retina is built as a mechanistically interpretable machine-learning model, trained on more than 1,000 hours of retinal ganglion cell (RGC) activity collected from 71 non-human primate recordings. This model allows researchers to generate testable predictions describing how retinal circuits compute and process visual information. It also provides a

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framework for understanding how individual retinas differ, helping to map the manifold of variability across retinal systems. Dr. Idrees bridges neuroscience, computational modelling and machine learning with a project that offers potential in both medical and research fields.

The second speaker of Friday afternoon was Dr. Song. Song's research is an intersection between basic and applied vision and cognitive science. She asks driving- inspired questions to understand how the human visual system supports daily life, and applying this fundamental knowledge to human factors issues in traffic safety.

Song's seminar presentation examined the complex visual and cognitive processes involved in driving. Although often viewed as a mundane part of everyday life, driving demands the brain to rapidly process information, predict upcoming events, and handle multiple streams of information simultaneously. Understanding these cognitive and perceptual mechanisms, including where they are prone to failure is essential for improving road safety.

Dashcam footage of real driving scenarios were used in a laboratory for the purpose of investigating how drivers manage the spatio-temporal demands of road scene and hazard perception. The data collected from these eye-tracking experiments revealed that drivers often anticipate the onset of hazards, positioning their gaze to respond quickly. Gaze behaviour alone does not fully explain the detection of hazards. Drivers can sometimes detect hazards without directly looking at them, while at other times they fail to notice hazards even when they are looking directly at them. These findings emphasize the critical role of peripheral vision and predictive processing taking place in complex road scenarios.

Studying naturalistic and controlled driving conditions advance our understanding of scene perception while having practical application for developing technologies and strategies to enhance road safety.

Reference List

Saad Idrees, SI. (2025, November 21th). *Digital Retina: A Generalizable Machine Learning Model of Primate Retinal Computations*. https://www.yorku.ca/cvr/all-events/

Jiali Song, JS. (2025, November 21th). *Driving towards understanding: What naturalistic road scenes tell us about human perception and cognition.* https://www.yorku.ca/cvr/all-events/

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January Opportunities, and Events at York University: CIAN, CVR, and the Neuroscience Society.

CIAN – Centre for Integrative and Applied Neuroscience: A neuroscience research group at York University; its aim is to collaborate as a unit on subjects including, but not limited to health, education, and the industry. The organization hosts research seminars, conferences and events for scientists and interested members of all academic backgrounds and interests, including the general public.

Upcoming January Seminars:

- **Friday, January 9th, 2026 @ 2:00pm-3:30pm** in Kaneff Tower, Room 519 | Dr. Takashi Sato's "*Optogenetic training facilitates stroke recovery*" seminar

CVR – Centre for Vision Research: York University's specialized vision research organization that comprises of leading scientists and professionals who aim to conduct ground-breaking research and further develop training in this field. Research seminars and events are also hosted for the benefit of interested members of all academic backgrounds and interests, including the general public.

Upcoming November Seminars:

- **Friday, January 16th, 2026 @ 2:00pm-3:30pm** in Kaneff Tower, Room 519 | Seminar
- **Friday, January 23rd, 2026 @ 2:00pm-3:30pm** in Kaneff Tower, Room 519 | Dr. Kate Bonnen from Indiana University
- **Friday, January 30th, 2026 @ 2:00pm-3:30pm** in Kaneff Tower, Room 519 | Seminar

Seminars are accessible to the general public; anyone is welcome to attend these lectures and ask questions.

Add our 1B2A Seminars and Events Calendar to stay up to date with events at York University.

Neuroscience Society at York University:

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A Grateful Thank You

This month's article, and the newsletter itself, would not have been made possible without the help of the following intelligent, talented, and passionate individuals who have dedicated time to present their original work and support the development of this month's issue. If you are interested in joining our team as we develop our issues for December 2025 and further, please click at the google form link attached below. Members of all disciplines and backgrounds are welcome to take part in this initiative.

Denz Marieon Pasion | *Head of Photography*
Dr. Dejan Todorović | *Featured CVR Lecturer*
Dr. Doug Crawford | *Featured CVR Lecturer*
Hana Sopel-Mizrahi | *Founder* | *Editor* | *Author* | *Head of Interviews*
Jana Alagha | *Head Editor* | *Author*
Dr. Jiali Song | *Featured CVR Lecturer*
Jona-Marie Medrazo | *Volunteer Interviewer*
Dr. Jonathan Michaels | *Interviewee*
Kayla Williams | *Interviewee*
Lana Putros | *Visual Media Designer*
Nicole Pitkis | *Head of Visual Media Design* | *Editor* | *Author*
Dr. Peter Kohler | *Supervising Staff Faculty*
Dr. Saad Idrees | *Featured CVR Lecturer*
Valentina Dodaro | *Head of Seminars and Events*

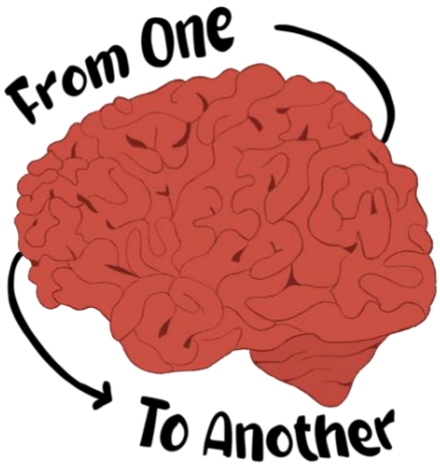

Illustration illustrated by Lana Petros.

Cover Page illustrated by Nicole Pitkis.

Logo designed by Nicole Pitkis.

CVR Seminar Photography captured by Denz Marieon Pasion

Neuroscience Society at YorkU Media illustrated by Allegra Favaretto

We are always welcoming **students who want to contribute** and **gain some volunteer/research experience**. If that's you, please fill out our **google form.**

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