

# Meaghan McManus Ph.D.

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Researcher with extensive experience in research design, programming virtual reality-based experiments, statistics, project management, and data analysis. Additional experience working on multiyear microgravity experiments in conjunction with the Canadian Space Agency. Proficient in programming and data analysis using R, C# (Unity), JASP, SPSS, Sigma Plot, and Excel. Some additional experience with Python and MATLAB. Invited to run virtual reality-based programming workshops, and present current research. Strong expertise in cognitive psychology, multisensory integration, and vision science. Adept at working independently and within teams. Successfully taught multiple seminars with excellent feedback.

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## Education

- 2021-Present Giessen University, *Postdoctoral Researcher*  
Supervisor: Dr. Katja Fiehler
- 2014-2020 York University, *Ph.D.*  
Supervisor: Dr. Laurence Harris  
Dissertation: The Effect of Perceived Self-Orientation on the Perception of Visually Induced Self-Motion
- 2013-2014 University of Edinburgh, *M.Sc.*  
Supervisor: Dr. David Carmel  
Dissertation: The Effect of Motion on Spatial Memory
- 2013 Carleton University, *B.Cog.Sci. (with Distinction)*  
Supervisor: Dr. Jim Davies
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## Career

### **Justus-Liebig-Universität Gießen, Germany**

2021-Present Postdoctoral Researcher for The Adaptive Mind Grant funded via The Hessian Ministry of Science and the Arts.

Investigating the topic of perception and action. My work specifically focuses on distortions in our mental representations of the space around our body and how this might affect our ability to keep track of unseen objects or judge the size/distance of objects. One project consisting of four different experiments looked at how we use egocentric (object relative to self) and allocentric (object relative to object) cues to keep track of the real world while in virtual reality. Another project, consisting of 2 different experiments, looks at how the space around our body might be distorted leading to misperceptions of visual or haptic size. Finally, an ongoing project which combines virtual reality and eye tracking looks at how we view and navigate around complex objects in a naturalist virtual environment (statues in a museum). During my postdoc I have also gained some experience writing grant proposals.

2021-Present Student Mentor

I have extensive experience working with and supporting students towards the completion of their theses. I have worked with one master's student and four undergraduate students. I design and program the project and then work with the student to develop a literature review, expose, oral presentation, and poster presentation. I also help the students with the writing of their thesis by providing documents that I have developed that break down the different sections of the thesis into easy-to-understand steps with examples. I also provide feedback on all stages of the thesis draft.

2023-2024      Lecturer for the Programming Virtual Reality Based Psychophysical Experiments course

Coordinated and lectured a master's level programming course, delivering weekly two-hour lectures and demonstrations on how to design and program a virtual reality based experiment. I worked with students from diverse backgrounds with different levels of programming experience. I continuously received strong positive feedback on the organization and pacing of the course from both the students and the program coordinator. I have run the course both in the summer of 2023 and 2024.

2024              Visual Neuroscience Summer School

I participated in a 2-week intensive summer school focusing on visual neuroscience, "From spikes to awareness".

### **York University, Canada**

2013-2020      PhD under the supervision of Dr. Harris.

Conducted several experiments investigating the integration of visual and vestibular cues during visual self-motion. My research was mainly done using virtual reality. I also gained experience working with large equipment such as tumbling rooms as well as different statistical analysis techniques from ANOVAs to Linear Mixed Models. My thesis included a chapter on changes in visual self-motion perception during microgravity exposure using the data collected for the VECTON project described below.

2016-2024      Student researcher for VECTON in Hypogravity Grant funded via the Canadian Space Agency.

I worked as a student researcher on a multiyear grant funded by the Canadian Space agency investigating how changes in gravity affect orientation, self-motion, and size/distance perception. I helped to design the experiments as well as test them during parabolic flight. I frequently travelled to Huston to collect and analyze the data from the participants on Earth and on the International Space Station. I also contributed to the analysis of the data, as well as the writing of the papers.

2018-2019      Student Mentor

I mentored two students during the completion of their undergraduate theses. I supported in the development and programming of the project and provided support and feedback on the written thesis. One of the students received the Canadian Psychology Association's Certificate of Academic Excellence.

2015-2018      Natural Sciences and Engineering Research Council (NSERC) Brain in Action International Research Training Group.

As a trainee in the "IRTG" I participated in an annual science retreat, gave talks on my research, and worked on a project with Dr. Gegenfurtner where we combined my skills with virtual reality with the EEG skills in his lab to

investigate the topic of size constancy. I learned to program SSVEP based EEG experiments for virtual reality and gained some basic experience in running EEG experiments.

## 2014-2020 York University Teaching Assistantship

I worked as a teaching assistant in a variety of different psychology courses. Some examples include Sensation and Perception, Cognition, and Research Methods. I held weekly office hours, in certain courses held weekly tutorials to go over the material from the class, I developed rubrics for grading, and graded assignments and exams. One course was the Advanced Research Methods where I was responsible for 10-12 students who were completing their thesis. I was responsible for helping each student to design, organize, and run their own survey-based thesis. I ran tutorials on project management, statistical analysis, and thesis writing. I received strong positive feedback from the students in my tutorial.

## Edinburgh, Scotland

### 2013-2014 Master's degree under the supervision of Dr Carmel.

My thesis focused on the how viewing rotating visual motion might lead to shifts in spatial memory. This work was done in conjunction with the Camera Obscura Museum of Illusions in Edinburgh Scotland. For this project I gained experience collaborating with non-university agencies and time management.

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## Publications

**McManus, M, & Fiehler, K (2025).** The effect ofvection on the use of optic flow cues. *Scientific Reports.*

**McManus, M, Harris, LR, & Fiehler, K (2025).** Haptic size perception is influenced by body and object orientation.

Jörges, B., Bury, N., **McManus, M., Bansal, A., Allison, R. S., Jenkin, M., & Harris, L. R. (2024).** The impact of gravity on perceived object height. *npj Microgravity, 10(1), 95.*

Bansal, A., **McManus, M., Jörges, B., & Harris, L. R. (2024).** Perceived travel distance depends on the speed and direction of self-motion. *Plos one, 19(9), e0305661.*

Jörges, B., Bury, N., **McManus, M., Bansal, A., Allison, R. S., Jenkin, M., & Harris, L. R. (2024).** The effects of long-term exposure to microgravity and body orientation relative to gravity on perceived travel distance. *npj Microgravity, 10(1), 28*

**McManus, M., Schütz, I., Voudouris, D., & Fiehler, K. (2023).** How visuomotor predictability and task demands affect tactile sensitivity on a moving limb during object interaction in a virtual environment. *Royal Society Open Science, 10(12), 231259*

- McManus**, M., & Harris, L. R. (2023). Enhancement of visual cues to self-motion during a visual/vestibular conflict. *PLoS one*, 18(3), e0282975
- Kim, JJ, **McManus**, M, & Harris, LR (2021). Body Orientation Affects the Perceived Size of Objects. *Perception*, <https://doi.org/10.1177/03010066211065673>.
- McManus**, M., & Harris, LR (2021). When gravity is not where it should be: How perceived orientation affects visual self-motion processing. *Plos one*, 16 (1), e0243381. <https://doi.org/10.1371/journal.pone.0243381>
- Gibson ME, Kim JJ, **McManus**, M, Harris LR (2020). The effect of training on the perceived approach angle in visual vertical heading judgements in a virtual environment. *Experimental Brain Research*. 238(9), 1861–1869. <https://doi.org/10.1007/s00221-020-05841-8>
- Chen\* J, **McManus**,\* M, Valsecchi M, Harris LR, Gegenfurtner KR (2019). Steady state visually evoked potentials reveal partial size constancy in early visual cortex. *Journal of Vision*, 19(6), 8-8. <https://doi.org/10.1167/19.6.8>
- \*Shared First Authorship

**McManus** M, D'Amour S, Harris LR (2017). Using optic flow in the far peripheral field. *Journal of Vision*, 17(8), 3-3. <https://doi.org/10.1167/17.8.3>

### Publications In Process

**McManus**, M., Seifert, F., Schütz, I., Fiehler, K. (in proof). Allocentric spatial representations dominate when switching between real and virtual worlds. *Journal of Experimental Psychology: Human Perception and Performance*.

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### Awards

2024	Canadian Space Health Research Symposium Best Poster Presentation
2024	GGN Travel Grant
2023	Winner of the GNN Science Presentation Slam
2014	York University Entrance Scholarship
2009	Carleton University Entrance Scholarship

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### Invited Academic Talks

2024	“Multisensory Integration in VR”. Guest speaker for Dr. Wallace’s weekly lab meeting, Vanderbilt University
2024	“Introduction to multisensory integration”. Guest lecturer for the master’s in Psychology Perception and Action seminar at the Justus Liebig University Giessen.
2023	“Multisensory Space Perception and the Influence of Gravity”. Guest lecturer for the Masters in Brain and Behaviour Perception and Action seminar at the Justus Liebig University Giessen.

## Workshops

2024	The Adaptive Mind YoungPro method workshops. I hosted a two-day workshop on “How to program psychophysical experiments in virtual reality”. The attendees were graduate students and postdoctoral researchers from a variety of different academic backgrounds
2019	Facilitator for the Virtual Reality for Scientists intensive workshop
2018	Facilitator for the Virtual Reality for Scientists intensive workshop

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## Community Outreach

2023-Present	I volunteer as a reviewer for the following journals: Journal of Neuroscience, Perception, PlosOne, Scientific Reports, Vision Research
2023	Gave a public talk at the Schering Stiftung in Berlin Germany titled “Perception in virtual reality: How we can use VR to distort our sense of orientation and space”. The Schering foundation hosts exhibits from different artists and then invites a scientist to come give a talk on topics related to the artwork
2022	Volunteered for the Justus Liebig Open Campus Day. I set up and ran a booth which demonstrated different virtual reality experiments the psychology department was running. I was also in charge of explaining why these studies were conducted and what they had found. The attendees were from a variety of different age groups, and social and cultural backgrounds
2014	I volunteered as an assistant for Edinburgh University’s Neuropsychology department’s Fringe Festival Visual Illusions Performance. I helped to run demonstrations and explain visual illusions to a diverse population during the annual Fringe Festival

## Conference Talks

**McManus M, Fiehler K (2024).** Where is the door? Can people keep track of one environment while immersed in another? European Conference on Visual Perception, Aberdeen Scotland

**McManus M, Schütz I, Voudouris D, and Fiehler K (2022).** Slicing objects with a sword: Tactile Suppression During a Dynamic Task in Virtual Reality. Tagung experimentell arbeitender Psycholog (teap). Virtual Meeting.

**McManus M, Harris LR (2020).** How real and perceived tilt affect visual self-motion processing. Vestibular-Oriented Research Meeting, Virtual meeting.

**McManus M, Harris LR (2017).**vection is enhanced by conflict between visual and non-visual cues to orientation. International Multisensory Research Forum Nashville, USA

## Extended Abstracts and Conference Papers

Schuetz, I., **McManus, M.**, Fiehler, K., & Voudouris, D. (2022). Investigating Movement-Related Tactile Suppression Using Commercial VR Controllers. In *International Conference on Human Haptic Sensing and Touch Enabled Computer Applications* (pp. 225-233). Springer, Cham.

Joerges, B., Bury, N., **McManus, M.**, Allison, R. S., Jenkin, M., & Harris, L. R. (2021). Body posture affects the perception of visually simulated self-motion. *Journal of Vision*, 21(9), 2301-2301.

Herpers R, Harris LR, **McManus M**, Hofhammer T, Noppe A, Frett T, Jenkin M (2018). The somatogravitational illusion during centrifugation: sex differences. 39th International Society for Gravitational Physiology Meeting & European Space Agency Life Sciences Meeting, Noordwijk, Netherlands

## Conference Posters

**McManus M**, Jörges B, Bury N, Bansal A, Allison R.S, Jenkin M, Harris L.R (2024). Sensitivity tovection may influence astronauts' perception of visually created gravity in space. Canadian Space Health Research Symposium, London, Canada (Abstract 13)

**McManus M**, Schütz I, Voudouris D, and Fiehler K (2022). How visuomotor predictability affects tactile suppression: Slicing objects with a sword in virtual reality. International Multisensory Research Forum, Ulm, Germany (Abstract 368)

**McManus M**, Harris LR (2020). Contributions of vision, gravity, and the body during misestimations of orientation. Vision Sciences Society, Virtual meeting.

**McManus M**, & Harris, LR (2019). When gravity is not where it should be: effects on perceived self-motion. Vision Sciences Society, Florida, USA (Abstract 237)

**McManus M**, Harris LR (2018). Is linearvection enhanced when perceived upright is orthogonal to gravitational upright? Canadian Society for Brain, Behavior and Cognitive Science St. John's, Newfoundland (Abstract 226)

**McManus M**, Chen J, Harris LR, Gegenfurtner KR (2018). The neural correlate of size constancy measured with SSVEP in virtual reality. Vision Sciences Society, Florida, USA (Abstract 26.353)

**McManus M**, Harris LR (2016). Gravity may influence perceived linearly acceleratingvection. International Multisensory Research Forum Suzhou, China (Abstract 20)

**McManus M**, Harris LR (2015) The role of the periphery in self-motion. International Multisensory Research Forum Pisa, Italy (Abstract 102)