

CV

Tom Willems

Academic age: 0 month(s)

Education

Degree	Organisation	Duration
PhD / Dr.: Hippocampal engram formation Prof. Dr. Katharina Henke	Universität Bern - BE, CH Department of Psychology	10.2018 - Present 4 year(s) 11 month(s)
Further Advanced Studies: Erasmus Practical in Artificial Intelligence	Radboud University Nijmegen, NL Donders Institute for Brain, Cognition and Behaviour	03.2018 - 04.2018 2 month(s)
Master: Neuroscience (Grade: insigni cum laude)	University of Bonn, DE Institute of Cellular Neurosciences, Medical School	10.2015 - 02.2018 2 year(s) 5 month(s)
Bachelor: Biology (Grade: insigni cum laude)	Universität Hamburg, DE Faculty of Mathematics, Informatics, and Natural Sciences	10.2012 - 09.2015 3 year(s)
Bachelor: Erasmus Semester	University of Oslo, NO The Faculty of Mathematics and Natural Sciences	08.2014 - 12.2014 5 month(s)

Employment

Role	Organisation	Duration
Research Assistant	University Hospital Bonn, DE Department of Epileptology	02.2016 - 08.2016 7 month(s)

Role	Organisation	Duration
Lab Assistant	Molecular Pathology Lab Trier, DE Medical Laboratory	03.2014 - 03.2014 1 month(s)
Community Service (Freiwilliges Soziales Jahr): Paramedic	German Red Cross, DE Rettungswache Konz (Kreis Trier)	07.2011 - 04.2012 10 month(s)
Research Assistant	University of Luxembourg, LU Faculty of Humanities, Education and Social Sciences (FHSE)	12.2011 - 03.2012 4 month(s)

Major achievements

Achievement 1

One of my major scientific achievements during my Ph. D. was that I showed the effectiveness of MRI scanners with a field strength of 7 Tesla (T) in investigating memory and the engram [1]. MRI scanners with this kind of field strength offer a wide range of advantages in image quality and resolution compared to scanners with a field strength of 3T and they have increased in number around the world in recent years. Their greater sensitivity and signal strength make it more feasible to image smaller brain structures and structures that have low signal intensity because of their anatomical characteristics. One example of such a structure is the hippocampus, which is crucial for certain types of memory, such as episodic memories. Together with sophisticated multivariate analysis techniques and machine learning algorithms, it is now possible to identify stable engram patterns in humans. Additionally, I was happy to have been part of a methodological study that probed the advantages of structural imaging at a field strength of 7T [2].

[1] journal-article. Willems, T., & Henke, K. (2021). Imaging human engrams using 7 Tesla magnetic resonance imaging. *Hippocampus*, 31(12), 1257–1270. [DOI](#).

[2] journal-article. Piredda, G. F., Caneschi, S., Hilbert, T., Bonanno, G., Joseph, A., Egger, K., Peter, J., Klöppel, S., Jehli, E., Grieder, M., Slotboom, J., Seiffge, D., Goeldlin, M., Hoepner, R., Willems, T., Vulliemoz, S., Seeck, M., Venkatesgowda, P. B., Jerez, R. A. C., ... Radojewski, P. (2022). Submillimeter T1 atlas for subject-specific abnormality detection at 7T. *Magnetic Resonance in Medicine*, 89(4), 1601–1616. <https://doi.org/10.1002/mrm.29540>. [DOI](#).

Achievement 2

At an early stage in my academic career, I measured the cost of social anxiety [1]. For many people, social interaction is inherently rewarding. But if someone suffers from social anxiety, social interaction can turn into something that is actively avoided. To probe this, we combined risky economic choices in a gambling task with social feedback. We designed a gambling task with two options, a gamble and a safe option. In the safe option, the monetary reward was certain. The gamble option had a known but uncertain outcome. The amount of money to be obtained from the safe option would vary to make the gamble more or less attractive. Crucially, the gamble was accompanied by social feedback (e.g., a condescending opponent laughing at you because of a lost gamble). Participants with higher anxiety scores chose the safe option more often, even when the amount to win was lower than the expected outcome of the gamble, i.e., economically unfavourable. We were able to identify a subcortical network that underlied this socially avoidant behavior. Not only did this study provide me with the opportunity to work with brain imagining, which has always fascinated me, but also showed me the importance of a clever behavioral design. After all, this study taught me to devise an intricate research design which measured a desired effect with precision and ecological validity, which is why I consider it one of my major achievements. Although high computing power combined with a huge amount of data can work wonders in answering complicated questions about our complex cognition, but the quality of the data is still the most important building block in this equation, and I am glad to be aware of that fact.

[1] journal-article. Johannes Schultz, Tom Willems, Maria Gädeke, Ghada Chakkour, Alexander Franke, Bernd Weber, Rene Hurlemann (2019) A human subcortical network underlying social avoidance revealed by risky economic choices eLife 8:e45249. [DOI](#).

Achievement 3

As indicated by my CV, frequent exchanges and time spent abroad have been an integral part of my education and academic career so far. After completing my master's degree, I switched from a MINT-faculty to a faculty of humanities. In my impression, the latter is dominated by top-down thinking: Complex phenomena are observed and models to explain them are conceptualized. Contrarily, natural sciences are dominated by bottom-up approaches, even though they are no strangers to hypothesis-driven research. Being taught in both disciplines gave me a lot of insight into how these opposite perspectives can be united. This enables me to not only look at a scientific problem from both perspectives, but also to teach in more flexible ways. During my PhD, I supervised four Bachelor theses and one Master thesis. I am confident that my background helped me to advise the students in how to approach different problems during their thesis. Moreover, I conceptualized and taught five seminars for master students in psychology as a co-tutor to my supervisor. The topics were diverse, ranging from hippocampal memory formation, over epigenetics to neurolinguistics. All seminars received a very good evaluation. Successfully teaching such diverse topics gave me confidence in my teaching skills, which have surely benefited from the rich and diverse academic experiences during my own education.
