



# Aging & Cognition Research Group



Are you pursuing a degree in neuroscience, medicine, psychology, computer science or related fields? Are you looking for an exciting Bachelor, Masters or MD-PhD project? Our research combines cutting-edge neuroscience and virtual reality (VR) approaches to understand and preserve cognitive and emotional well-being in humans. We are based at the DZNE on OvGU's medical campus, and you can find more information about our work on [www.wolberslab.net](http://www.wolberslab.net)

We are currently offering the following positions:

- 1. Project Idea:** In the current project, spatial memory of different age groups will be measured in different contexts. The focus of the thesis will be to recruit and test participants for a desktop virtual environment study and to analyze the acquired data. The experiment will shed light on how different geometric layouts affect spatial memory and perceptual behaviors in typical aging.

**Supervisor:** Tugce Belge  
**Methods:** Desktop VR, Behavioral data analysis  
**Required Qualifications:** Fluent German and English, Experience with the statistical analysis of behavioral data  
**Starting Date:** As soon as possible  
**Positions available:** 1  
**Contact email:** [Tugce.Belge@dzne.de](mailto:Tugce.Belge@dzne.de)

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- 2. Project Idea:** Can we create a simple behavioural task to measure the heading direction system of the human brain? For this project, you will help me develop a new path integration task using virtual reality and then measure young healthy participants. Next, you will perform some statistical analysis on the data you acquired and also work on a new computational model to investigate the heading direction system using the different conditions of the experiments.

**Supervisor:** Matthieu Bernard  
**Methods:** VR with Head Mounted Device, Behavioral data analysis  
**Required Qualifications:** Fluent German, Knowledge of basic stats and R or Python  
**Starting Date:** September or October 2021  
**Positions available:** 1  
**Contact email:** [Matthieu.Bernard@dzne.de](mailto:Matthieu.Bernard@dzne.de)

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- 3. Project Idea:** Have you ever felt sick or nauseous when engaging in VR? Have you ever wondered why that happens? Motion Sickness or the more scientifically accurate term "Cybersickness" is one of the factors that hinders some of its users. There are studies that establish that Head-Up Display do have an impact on Cybersickness. The aim of the study would be to measure the varying effects of Cybersickness experienced with Diegetic and Non Diegetic Head-Up Display with potentially estimating more concrete measures than questionnaires such as sweating, fatigue, eye strain, vertigo etc.

**Supervisor:** Muhammad Ashar Imtiaz  
**Methods:** VR with Head Mounted Device, Head-Up Display Design  
**Required Qualifications:** Fluent German and English, Potential knowledge with creating VR based Games using Unreal Engine or Unity  
**Starting Date:** As soon as possible  
**Positions available:** 1  
**Contact email:** [Muhammad-Ashar.Imtiaz@dzne.de](mailto:Muhammad-Ashar.Imtiaz@dzne.de)

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- 4. Project Idea:** Estimating one's orientation in the environment is a vital component of spatial navigation, and can be derived from the weighted combination of visual and body-based cues. In the proposed project, we will use immersive VR to study how exactly these two distinct sources of information are combined in healthy young adults, and how this changes during aging.

**Supervisor:** Jonathan Shine  
**Methods:** VR with Head Mounted Device, Behavioural data analysis  
**Required Qualifications:** Fluent German, Knowledge of statistics and R or python  
**Starting Date:** November 2021  
**Positions available:** 1  
**Contact email:** [Jonathan.Shine@dzne.de](mailto:Jonathan.Shine@dzne.de)

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- 5. Project Idea:** Could interindividual differences in navigational abilities be predicted by the activity of brain areas that encode spatial information? In this project, we will study grid cells to see if the integrity of their activity can predict the navigational performance of our human participants (if you want to know more about grid cells, you can read [here](#)). We will use virtual reality and functional MRI (fMRI), and you will help collect behavioral and fMRI data. You will also be involved in analyzing the behavioral data you collect. If you have any questions or like to know more about the project, do not hesitate to contact me.

**Supervisor:** Marzieh Fereidouni  
**Methods:** VR and fMRI, Behavioural data analysis  
**Required Qualifications:** Fluent German and English, Knowledge of basic statistics, and Matlab or python (or R)  
**Starting Date:** October 2021  
**Positions available:** 1  
**Contact email:** [Marzieh.Fereidouni@dzne.de](mailto:Marzieh.Fereidouni@dzne.de)

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**6. Project Idea:** Can path integration provide a sensitive biomarker to distinguish between healthy older adults and those with early Alzheimer's disease pathology? Path integration refers to continuous updating of one's own position in space and represents a fundamental component of spatial navigation. Previous research shows that this ability declines in older adults. In the current project, we will compare performance on a path integration task in older adults with and without additional landmark information (distal/proximal) to investigate if there are differences in capturing age-related decline in path integration. Results from this project will contribute to a development of a clinical version of the path integration task.

<b>Supervisor:</b>	Vladislava Segen
<b>Methods:</b>	VR with Head Mounted Device, Behavioural data analysis
<b>Required Qualifications:</b>	Fluent German and English, Knowledge of basic statistics, and R or python (or interest in developing those skills)
<b>Starting Date:</b>	October 2021
<b>Positions available:</b>	1
<b>Contact email:</b>	<a href="mailto:Vladislava.Segen@dzne.de">Vladislava.Segen@dzne.de</a>

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We look forward to hearing from you. If you are interested in a particular project, please get in touch with the scientist in charge via the contact email.