

GERARD CALLAU NAVARRO

PhD student at DZNE

SUMMARY

PhD candidate at DZNE, contributing to a longitudinal project that investigates the behavioural, cognitive, and neurophysiological profiles of SuperAgers. Building on the foundation established during my Master's in Neuroscience at The University of Edinburgh, I have developed expertise in applying cutting-edge imaging sensors and in vivo electrophysiology to explore the neural mechanisms underlying spatial navigation and episodic memory.

TECHNICAL SKILLS

- **Python:** Proficient, with specialisation in neural data analysis.
- **Photometry and Electrophysiology:** Proficient in conducting fibre photometry and tetrode-based electrophysiology experiments to monitor and analyse real-time neural activity.
- **Microcontrollers and Electronics:** Knowledge of microcontroller programming, circuit design, and integration of sensors and motors for automated experimental systems.
- **fMRI Analysis:** fundamental knowledge of fMRI data preprocessing and analysis.

RESEARCH EXPERIENCE

PhD Researcher

Deutsches Zentrum für Neurodegenerative Erkrankungen (DZNE), Wolber's Lab • February 2025 - Present

- Contributing to a longitudinal project investigating the behavioural, cognitive, and neurophysiological profiles of SuperAgers to understand the preservation of exceptional cognitive function in ageing.
- Examining the computational mechanisms underlying superior episodic and spatial memory in older adults.
- Combining techniques—such as VR, 7T fMRI, and diffusion MRI—to assess neural and cognitive factors in ageing.

Master's Research Project

The University of Edinburgh, Nolan Lab • January 2023 - August 2024

- Investigated high-speed monitoring of neural activity in genetically defined neural populations during sharp wave ripple events in rodent models.
- Contributed to the ideation and refinement of behavioural protocols, including literature reviews and protocol optimisation.
- Combined fibre photometry and electrophysiology recordings to monitor and analyse neural activity.
- Evaluated the use of single photon avalanche diode (SPAD) sensors to capture high-frame-rate images during in vivo experiments.
- Developed and optimised Python scripts for neural data analysis, using libraries such as Pynapple, Pandas, SciPy, NumPy, and Matplotlib.
- Analysed how ripple characteristics were related to learning and memory consolidation.
- Enhanced understanding of neural activity during sleep phases.

EDUCATION

PhD, Neuroscience

Deutsches Zentrum für Neurodegenerative Erkrankungen (DZNE), Wolber's Lab •
February 2025 - Present

- Investigating episodic memory and spatial navigation in SuperAgers.

MScR Neuroscience (Integrative Neuroscience)

The University of Edinburgh • *September 2023 - September 2024*
Awarded Distinction

- Specialised in Neural Dynamics, experimental design, and statistical analysis for neuroimaging and electrophysiology studies.
- Participated in themed-week lectures covering various areas of neuroscience, gaining broad exposure to current research and methodologies.

Psychology BSc (Hons)

Loughborough University • *2019 - 2023*

- Gained knowledge in creating and implementing behavioural paradigms to explore cognitive processes.
- Acquired advanced quantitative research methods skills.

PROFESSIONAL DEVELOPMENT

NEUROKIT Experimental Neuroscience Bootcamp 2024

CAJAL Advanced Neuroscience Training, No Black Boxes • *September, 2024*

- Participated in an intensive training bootcamp designed to bridge knowledge gaps in experimental neuroscience. The course focused on building integrated systems by applying a broad range of techniques from electronic hardware development to optical system design and deep neural network training.

POSITIONS OF RESPONSIBILITY

Student Representative, MScR Neuroscience (Integrative Neuroscience)

The University of Edinburgh • *September 2023 - September 2024*

- Serving as the liaison between students and faculty, representing student interests and feedback in program development meetings.
- Organized and led regular discussions on course improvements, student welfare, and academic resources, enhancing communication and fostering a collaborative academic environment.

LANGUAGES

English: native

Spanish: native

Catalan: native

German: currently learning