## Proposal of Master Research Project / Proyecto fin de Master for the academic year 2025-26

Group name: Neural circuits in vision for action IP name: Andreas Kardamakis Group web: https://in.umh-csic.es/en/grupos/neural-circuits-in-vision-for-action/ Title of the MRP/TFM:

Shaping Attention in Virtual Reality: A Behavioral Platform for Studying Distraction in Immersive Environments

How do we focus our attention—and what breaks it? This project aims to develop a cuttingedge **virtual reality (VR) platform** to study attention and distraction in humans through immersive, ecologically relevant tasks.

Participants will engage in visually demanding tasks within fully controlled 3D environments, where **distractors are precisely placed and timed**. Using an integrated **eye-tracking system**, we will measure **gaze patterns**, **saccades**, **and pupil dilation** to quantify attentional engagement and arousal in real time.

This VR framework will serve as the foundation for future **EEG integration**, enabling synchronized brain-behavior analysis. Ultimately, the platform will support translational research into attention-related disorders using realistic, dynamic settings.

Key Aims

- Design and implement immersive VR attention tasks
- Measure behavioral performance and gaze dynamics (fixations, saccades, reaction times)
- Analyze **pupil size** as a proxy for attentional load and arousal
- Build an extensible platform ready for potential EEG integration

Techniques You'll Learn

- VR development using Unity or Unreal Engine
- Eye-tracking integration for gaze and pupilometry analysis
- Experimental task design in cognitive neuroscience
- Behavioral data collection and analysis (Python/MATLAB)
- Multimodal human neuroscience experimentation

Who Should Apply

This project is ideal for students interested in human attention, immersive cognition, and neurotechnology development.

- Programming experience is required (e.g. Python or MATLAB)
- Experience with game engines (Unity or Unreal) is a strong plus
- Interest in working with eye-tracking and psychophysiological data is important

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