

Memory in Microgravity

Designing XR Diaries for Learning and Reflection in Space

How Space Affects Human **Memory & Learning**



Space Fog

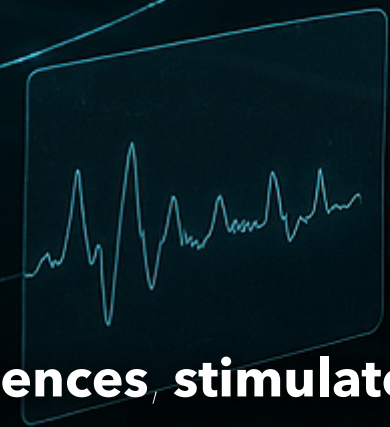
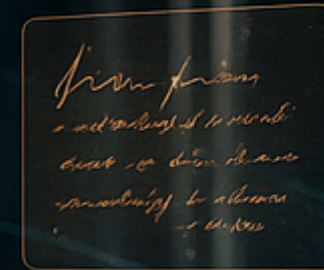
a form of brain fog characterized by difficulty concentrating, reduced cognitive ability, and confusion, due to a combination of factors like microgravity, sleep disruption, and environmental stressors.

When **gravity** disappears, what **anchors our memories**?



XR Learning Diary in Space:

A System for Embodied Learning and Reflection



How can we help users learn and reflect when gravity—and all familiar cues—disappear?

XR Learning Diary = A fusion of **XR + AI + human senses**, designed to **capture experiences**, **stimulate reflection**, and **visualize memory**.

it's a **"thinking companion"** that travels with you through space

Imagine writing a diary not with words, but with your gaze, heartbeat, and feelings.

Recording Experience Through the Body



- 👁️ Gaze trajectory — what caught your attention
- 🎥 Visual frame — what you saw
- 🗣️ Voice dialogue — what you said and heard
- 💓 Body response — how your heart and posture changed

Conversing with AI About Your Own Mind



Imagine writing a diary not with words, but with your gaze, heartbeat, and feelings.

Memory Visualization & Relearning



Personal Memory Archive about your Space Journey



Memory Visualization & Relearning



The system transforms experience logs into a Memory Constellation Map, not by time or location, but by emotional intensity and meaning. Users can wander through their own memories in XR space, revisit what mattered most. After returning to Earth, they can replay and re-analyze these journeys, learning from their own learning.



Thank you
A Journey to Explore the Universe