PANEL #1

VALENCIA
April 2025

Theme
Advances in VR Systems for Specialized Cognitive Services

DataSys 2025 & ComputationWorld 2025

PANEL #1

VALENCIA
April 2025

Moderators

Prof. Dr. Zahra Moussavi, University of Manitoba, Canada
Prof. Dr. Jérôme Dinet, University of Lorraine, France

Panelists

Dr. Marius N Varga, University of Plymouth, UK
Dr. Aurelie Mailloux, 2LPN, France
Dr. Dena Bazazian, University of Plymouth, UK
Prof. Dr. Petre Dini, IARIA, USA/EU

Chair Introduction

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- **Discussing key issues of VR applications for rehabilitation of older adults**
  - Benefits
  - Challenges
  - Adverse Effects?
  - Solutions
  - Optimum type of VR?
  - Future Innovations

Zahra Moussavi
Professor and Canada Research Chair
On Biomedical Engineering
University of Manitoba

Chair Introduction

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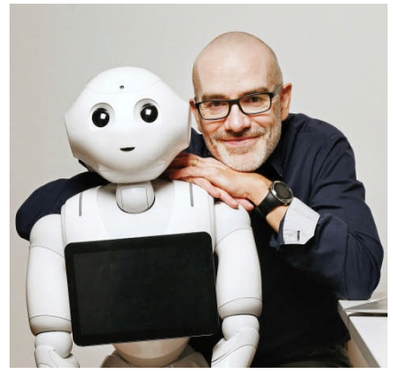
- **VR for assessment and training**
  - Traditional vs. Dl assessment ?
  - Technical vs. Non-Technical skills ?
  - What competencies for what jobs in the future ?
  - The problem of the “transfer” between VR and physical worlds?



Jerome Dinet (on the right side …)
Professor and Scientific director of the Chair “BEHAVIOUR”
University of Lorraine

Panelist Position

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APRIL 2025

Marius Varga
University of Plymouth
UK

- **Immersive cognitive therapy for digitally excluded older adults**
  - **Usability and sense making**
    - **Onboarding and active assistance**
    - **Customisation and adaptability for hardware**
    - **Adaptive simplified controls**
    - **Intuitive interactions**
  - **Immersive User experience**
    - **Affordability and accessibility**
    - **Multisensory experience**
    - **High quality visuals**
    - **Narrative and gamification**

Panelist Position

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Aurélie
Mailloux

Immersive environments benefits applied to healthcare field

Practitioners training => *improving knowledge, skills and behaviors* Strong evidence

=>Never the first time on patient

Patients care => *reducing pain, anxiety, medication* Strong evidence

Ethical aspects [HAS (June 2024)]

Pedagogical gain, financial stakes, data security, social dynamics

Panelist Position

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Aurélie
Mailloux

Risks for the health [French Agency Report ANSES (June 2021)]

Cyberkinetosis Strong evidence

Sensory-motor coordination Strong evidence

Effects related to physical agents emitted by virtual reality devices Strong evidence

Psychological and psychosocial effects Low-level evidence

Self-representation (through avatars) Low-level evidence

Neurological effects ?

Brain development ?

Panelist Position

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APRIL 2025

❖The Role of Computer Vision in Virtual Reality

DENA BAZAZIAN
Lecturer in Machin Vision and Robotics
University of Plymouth

- **"Enhancing Realism vs. Computational Efficiency in VR: Striking the Right Balance"**
  - How can advanced computer vision techniques (e.g., neural radiance fields, SLAM, generative models) improve realism in VR environments?
  - What are the trade-offs between rendering quality and computational efficiency, and how can we optimise performance without compromising immersion?
- **"The Ethics of AI-Powered Computer Vision in VR: Privacy, Bias, and Responsibility"**
  - How do computer vision-powered VR systems handle user data, and what privacy concerns arise?
  - Can bias in computer vision algorithms impact fairness and accessibility in VR applications?
  - What ethical guidelines should govern the integration of AI-driven vision systems in VR?

Panelist Position

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- **Immersive Literacy**
  - Environmental Remanence (Real vs Virtual)
  - Co-evolving with Technologies
  - The power of Augmented Reality and Immersion (from acceptance to use)
- **Personalized Cognitive Assistance**
  - Cognitive Rehabilitation
  - Elderly Cognitive Support
  - Learning Disabilities
- **Challenges**
  - **Adaptive algorithms** (Interactive Content, Feedback mechanisms)
  - **Accessibility** (Individuals in low-resource settings or with severe disabilities)
  - **Privacy and Ethics** (Safeguarding the sensitive data collected from users)
- **(Hidden) Side effects**
  - **Spatial deskilling** *(individuals lose their ability to perform spatial tasks)*
  - **Real-Virtual Cognitive Mismatch** *(reduced transfer of skills and knowledge from virtual to real settings)*
  - **Immersion Dependency**

Petre Dini
IARIA

Developmental Dyslexia and Nerve Noise
Low frequency stimuli [4.5, 40]
Parietal occipital regions:
Dyslexia:: deficit in syllables processing which is associated with the Theta band (4-7 Hz)
Brain Models: brain models that captures large-scale brain activity

Panelist Position

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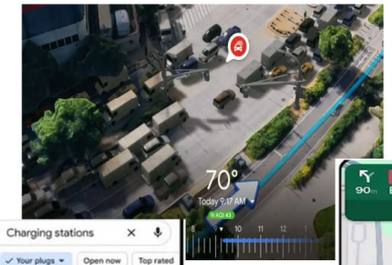
- **Dependency on Immersive Environments**
- **Several ways** (sensory disorientation, social interactions, cognitive overhead)
- **From Immersive to Real Environments** (sensory readaptation, isolation, decisions)
- **From Real to Immersive Environments** (overstimulation, confusion, escapism)

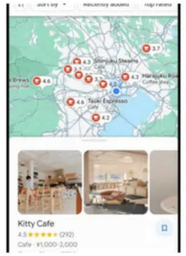
Panelist Position

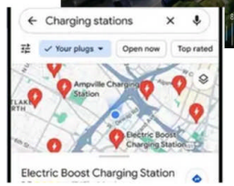
Google Maps getting major upgrade thanks to new trend taking world by storm

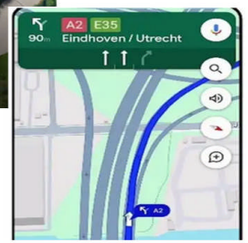
Google Maps gets a massive AI upgrade with 5 new features
The latest updates to Google Maps makes it smarter and more helpful
https://www.foxnews.com/tech/google-maps-gets-massive-ai-upgrade-5-new-features



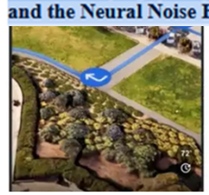
3D with Imm

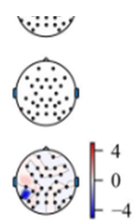


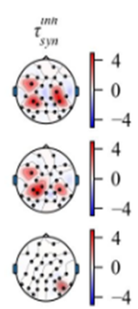




Abstract— Effective language processing relies on the brain's capacity to decode rhythmic cues in speech, a function primarily supported by activity in the theta frequency band. According to the Temporal Sampling Framework, impairments in this process may contribute to the phonological deficits observed in individuals with Developmental Dyslexia (DD). These challenges cascade into higher-frequency bands, affecting the integration of phonemes, words, and phrases, ultimately compromising reading and writing fluency. Early diagnosis and treatment are crucial for ensuring proper personal and academic development in children. In this study, we propose a non-invasive methodology that combines ElectroEncephaloGraphy (EEG) data with a surrogate modelling framework to detect early imbalances in Excitation/Inhibition (E/I) mechanisms. We applied this methodology to a cohort of children, divided into controls and DD groups, and compared the inferred E/I mechanisms with patterns predicted by the neural noise hypothesis. We found that the results obtained using this framework align with both the Temporal Sampling Framework and the Neural Noise Hypothesis.







Petre Dini
IARIA

Developmental Dyslexia and Nerve Noise
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From Immersive to Real Environments

Increase in E/I in parietal and frontal regions -> Neural Noise Hypothesis in Dyslexia

Increment of $\tau_{syn\,I}$ in frontal and parietal-central for 4.8 Hz. Significant differences decreases as stimuli increases.

Delayed responses of inhibitory currents due to increment of $\tau_{syn\,I}$ also aligns with Neural Noise Hypothesis in Dyslexia.

https://www.thinkmind.org/library/BRAININFO/BRAININFO_2025/braininfo_2025_2_30_90046.html

THE STAGE IS YOURS