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Présentation du laboratoire cerveau mémoire et cognition

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► **To cite this version:**

Alexandre Gaston-Bellegarde. Présentation du laboratoire cerveau mémoire et cognition. Les rencontres du Consortium 3D SHS, Mehdi Chayani; Xavier Granier; Florent Laroche; Caroline Delevoie, Dec 2019, Nantes, France. hal-02489035

HAL Id: hal-02489035

<https://hal.science/hal-02489035>

Submitted on 24 Feb 2020

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Les rencontres du Consortium 3D SHS

**Création - Usage scientifique -
Conservation des données 3D**

Présentation du laboratoire cerveau mémoire et cognition

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Gestion technique de la plateforme mutualisée
de réalité virtuelle RV-PSY
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2-3-4 décembre 2019

Université de Nantes Faculté des Sciences
et Techniques (FST)

Présentation du laboratoire cerveau mémoire et cognition

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MOTS-CLÉS

Plateform VR - Réalité virtuelle – Sciences cognitives –

PRESENTATION DU LABORATOIRE CERVEAU MEMOIRE ET COGNITION

Since 2014, the LMC is located on the one hand, at the Institute of Psychology of Paris Descartes University (Boulogne Billancourt) for teaching and basic research and Sainte Anne Hospital (Paris 75014) for neuropsychological and neuroimaging research. At the Institute of Psychology, we occupy 12 offices (150 m²), and 12 experimental rooms (163m³ including 58 m² dedicated to a virtual reality platform), totalling 313 m². At Sainte Anne Hospital, our office space covers 20 m².



VR PLATFORM (INSTITUTE OF PSYCHOLOGY)

The Memory & Cognition lab uses virtual reality to test subjects in controlled experimental conditions close to daily life. The objective of the platform (58 m² + 15m²) is to facilitate the VR immersion of subjects in these virtual contexts and make the most of new virtual universal user interfaces. We also use this platform to provide training for students (Master class) and external communication (media, meetings).

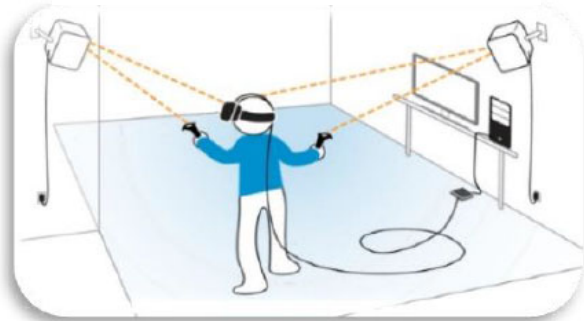
The virtual reality platform will also be extended at Sainte-Anne Hospital at the Center of clinical Research with a surface area of 25m² in early 2018.

A 15m² booth dedicated to the system HTC VIVE: the VR helmet is in charge a 5m² zone to integrate the body of the subject in that of the avatar. We will soon acquire an HTC VIVE system of relative position sensors.

SOFTWARE GAME CREATION AND URBAN AND SOCIAL ENVIRONMENT

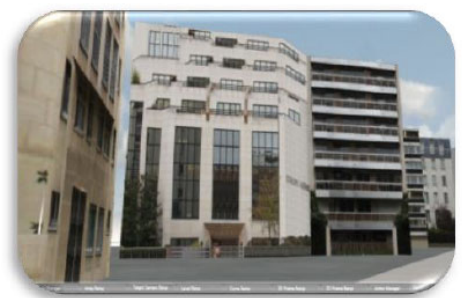
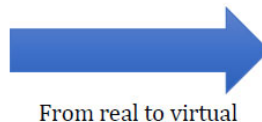
- Virtual Reality first development
- ✓ Production of material (photoshop, 3DSMAX, unity plug-in)
- ✓ Implementation of events: Elaboration of the behaviors of 3D entities in unity (C#). Integration of 3D character libraries into the software created in the laboratory. Creation of animated characters with Fuse maximo (creation and animation): use of existing 3D models and animations, use of plug-in unity.

FIGURE 1



- ✓ Modeling of Boulogne-Billancourt neighborhoods in collaboration with the IGN (maps & land registry) in the SPALIFE ANR project: comparison with the real environment, use of eye tracker glasses.

FIGURE 2



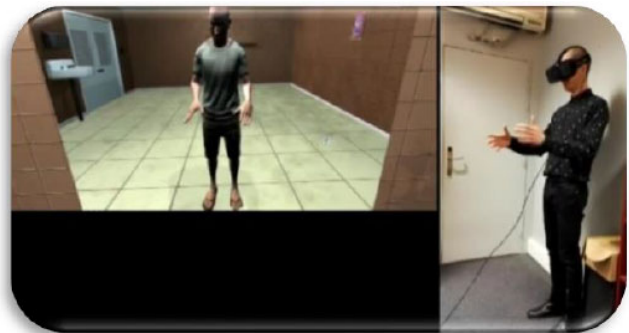
- ✓ Creation of a remediation and diagnostic application in schizophrenia patients concerning forward planning and prospective memory: collaboration with Sainte-Anne hospital (Mathurin game application: urban navigation and tasks apartment). This application is in use and evolves every year (SATT innovation under review).

FIGURE 3



- ✓ Integration of data gloves (Cyberglove) in order to create a post-stroke remediation tool: fine motor training. Collaboration with the CESEM-CNRS (Saints Pères).

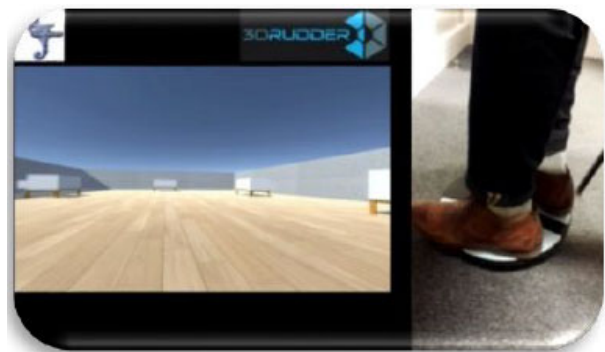
FIGURE 4



- ✓ Creation of an embodiment application: the subject sees his body in a VR helmet (DK2 oculus), his movements are retranscribed in the 3D universe thanks to a motion capture device (kinect). <https://youtu.be/kpC5x64E6IE>. We want to test the effects on memory via the perception of self.

- ✓ Application testing the storage of objects according to their affordant character: the subject moves in a virtual environment through a 3Ddrudder (displacement platform) and his gaze is recorded by means of an eyetracker (SMI) integrated in a VR helmet (Oculus DK2). <https://youtu.be/dz9LbNHXITY>

FIGURE 5



- ✓ Modeling of the RER C station Saint-Michel in Paris: collaboration with SNCF-transilien who provided us with the layout: study of the mental load in dense areas. Once the station was modeled, a doctoral student and a short-term contract member of staff worked together to populate the station (characters, trains), add urban furniture (taking videos on site, photos) and then modeling. <https://youtu.be/tRNI6Euvgis>

FIGURE 6



BIBLIOGRAPHIE

- *Lalanne J, *Rozenberg J, *Grolleau P, Piolino P. (2013). The self-reference effect on episodic memory recollection in young and older adults and Alzheimer's disease. *Curr Alzheimer Res*; 10(10):1107-17. Impact Factor: 2016 (2.952), sur 5 ans (3.459). Cité 11 fois.
- *Martinelli, P, *Anssens, A, *Sperduti, M, Piolino P (2013). The Influence of Normal Aging and Alzheimer's Disease in Autobiographical Memory Highly Related to the Self. *Neuropsychology*, 27(1): 69-78. Impact Factor: 2016 (3.286), sur 5 ans (3.734). Cité 32 fois.
- *Dutriaux L, Gyselinck V. (2016). Learning Is Better with the Hands Free: The Role of Posture in the Memory of Manipulable Objects. *PLoS One*. 2016 Jul 14;11(7):e0159108. doi: 10.1371/journal.pone.0159108. eCollection 2016. Impact Factor: 2016 (2.806), sur 5 ans (3.394).
- *Sperduti M, Arcangeli M, *Makowski D, *Wantzen P, Zalla T, Lemaire S, Dokic J, Pelletier J, Piolino P. (2016). The paradox of fiction: Emotional response toward fiction and the modulatory role of self-relevance. *Acta Psychol (Amst)*. 165:53-9. doi: 10.1016/j.actpsy.2016.02.003. Epub 2016 Feb 26. Impact Factor: 2016 (2.031), sur 5 ans (2.385).
- *Plancher, G, *Tirard A., Gyselinck, V., Nicolas, S. & Piolino, P. (2012). Using virtual reality for characterize episodic memory profiles in amnesic mild cognitive impairment and Alzheimer's disease : influence of active/passive encoding. *Neuropsychologia*, 50(5), 592-602. [Psycinfo; I IF JCR 2011: 3.816]. Impact Factor: 2016 (3.197), sur 5 ans (3.568). Cité 51 fois.
- *Jebara N, Orriols E, Zaoui M, Berthoz A, Piolino P. (2014). Effects of enactment in episodic memory: a pilot virtual reality study with young and elderly adults. *Front Aging Neurosci*. 2014 Dec 17;6:338. Impact Factor: 2016 (4.504), sur 5 ans (4.602). Cité 7 fois.
- *Martinelli P, *Sperduti M, Devauchelle AD, *Kalenzaga S, Gallarda T, Lion S, Delhommeau M, *Anssens A, Amado I, Meder JF, Krebs MO, Oppenheim C, Piolino P. (2013). Age-related changes in the functional network underlying specific and general autobiographical memory retrieval: a pivotal role for the anterior cingulate cortex. *PLoS One*. 8(12):e82385. Impact Factor: 2016 (2.806), sur 5 ans (3.394). Cité 10 fois.
- *Picard L, Mayor-Dubois C, Maeder P, *Kalenzaga S, *Abram M, *Duval C, Eustache F, Roulet-Perez E, Piolino P. (2013). Functional independence within the self-memory system: new insights from two cases of developmental amnesia. *Cortex*, 49(6):1463-81. Impact Factor: 2016 (4.279), sur 5 ans (4.703). Cité 18 fois.
- *Abram, M., *Picard, L., *Navarro, B. and Piolino, P. (2014). Mechanisms of autobiographical mental time travel to the past and to the future – new data in a lifespan approach. *Consciousness and Cognition*, 29, 76-89. Impact Factor: 2016 (2.144), sur 5 ans (2.383). Cité 7 fois.
- *Duval C, Desgranges B, de la Sayette V, Belliard S, Eustache F, Piolino P. (2012). What Happens to personal identity when semantic knowledge degrades: insights from semantic dementia. *Neuropsychologia* 50(2):254-65. Impact Factor: 2016 (3.197), sur 5 ans (3.568). Cité 52 fois.

Amado I, Brénugat-Herné L, Orriols E, Desombre C, *Dos Santos M, Prost Z, Krebs MO, Piolino P. (2016). A Serious Game to Improve Cognitive Functions in Schizophrenia: A Pilot Study. *Front Psychiatry*. 2016 Apr 20;7:64. doi: 10.3389/fpsy.2016.00064. eCollection 2016. Impact Factor: 2016 (3.532).

*Debarnot U, Crépon B, Orriols E, *Abram M, Charron S, Lion S, Roca P, Oppenheim C, Gueguen B, Ergis AM, Baron JC, Piolino P. (2015). Intermittent theta burst stimulation over left BA10 enhances virtual reality-based prospective memory in healthy aged subjects. *Neurobiol Aging*. 36(8):2360-9. Impact Factor: 2016 (5.117), sur 5 ans (4.949).