**2022/2023 Summer Research Project Description**

Please use this template to create a description of each research project, eligibility requirements and expected deliverables. Project details can then be uploaded to each faculty, school, institute, and centre webpage prior to the launch of the program.

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| **Project title:** | **Multisensory integration in 3D space using virtual reality (VR)** |
| **Project duration, hours of engagement & delivery mode** | 8 weeks during Summer Vacation, 20hrs per weekThe applicant will be required on-site for the project. |
| **Description:** | Virtual reality is a new and powerful approach to psychophysics allowing experiments in complex, ecologically valid environments that are still controllable. Here, we are using VR to investigate perception and action in 3D space. While space seems subjectively continuous, in terms of processing by the brain, it is in fact divided, and different brain systems appear to be involved in monitoring different regions of space with different priorities. Peripersonal space (PPS), the space closest to the body, is a mediation zone between the body and the environment and has been found to be prioritised for two functions: voluntary object-oriented action, and the identification and reaction to aversive stimuli (Graziano & Cooke, 2006; Rizzolatti et al., 1981). Evidence from cell recording paradigms, behavioural experiments, and functional imaging suggest that PPS is coded in a multisensory fashion (Ladavas & Serino, 2008) and in PPS, visual and tactile sensory information is integrated faster than information outside reach (Pavani & Castiello, 2003; Spence, Pavani, & Driver, 2004; Spence, Pavani, Maravita, & Holmes, 2004). PPS has been shown to be extremely dynamic, rapidly adjusting to both endogenous and exogenous factors. Most famously, manipulation-based PPS around the hands of monkeys was found to extend to a tool following active, but not passive, use of the tool (Iriki et al, 1996). PPS has been found to shrink in participants wearing wrist weights (Lourenco & Longo, 2009) and when dangerous objects were presented close to the boundary of the PPS (Coello et al., 2012). We are running several studies in VR that use multisensory integration (either audiovisual or visuotactile) to examine aspects of PPS. Our general approach is to use psychophysical methods, typically reaction times or signal detection theory. We use standard PCs to present participants with multisensory stimuli through a VR setup and record their responses. Our experimental programs are written in Unity. Experimental sessions usually involve a single participant completing several experimental tasks over a one-hour period. |
| **Expected outcomes and deliverables:** | Research scholars will be primarily involved in the experimental aspects of the project. Specifically, this might include the organisation and scheduling of experiment participation, the running of experimental sessions, and the collection and collating of raw data. Participation in weekly lab meetings will be expected and scholars may present experimental findings at these meetings.Scholars will gain skills in practical aspects of operating a psychological study including participant management, data collection, and communication of results. |
| **Suitable for:** | This project is open to psychology honours students who have completed at least their 3rd year of study. Programming experience will be useful. |
| **Primary Supervisor:** | Associate Professor Ada Kritikos |
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