Title
Interactive virtual reality for individuals with complex PTSD
Theme
Mathematical Biology and Medicine
Location
University of Exeter, Streatham Campus, Exeter EX4 4QJ
Primary Supervisor
Professor Krasimira Tsaneva-Atanasova, Department of Mathematics, College of Engineering, Mathematics and Physical Sciences
Additional Supervisors
Dr Anke Karl, Department of Psychology, College of Life and Environmental Sciences   Dr Phil Self, Devon NHS Partnership Trust

Project description
Individuals with complex PTSD after a history of early trauma show impairments in emotion regulation and social functioning (1) which are difficult to address in existing psychological therapies. Embodied virtual reality (VR) provides an effective, safe and ethically acceptable therapeutic approach for changing social cognition (2,3) and therefore lend themselves for novel psychological treatments (4). The development of interactive VR scenarios requires advanced mathematical modelling and machine learning (5,6). The aim of this PhD project is to develop a comprehensive emotion regulation and social skill training VR platform and conduct a proof-of-principle study in a healthy sample. In particular, the PhD aims to answer (i) What mathematical/machine learning approach supports the development of various training functions? What are the meaningful features and modelling approaches for virtual reality-based therapeutic scenarios (behaviours) for patients with PTSD and (ii) Do the pilot scenarios effectively change the targeted emotion regulation and social competency mechanism. For answering question (i), the student will use advanced data analysis combining statistical and machine learning techniques along with data-driven modelling of human movement and behaviour. For answering question (ii), the student will run an experimental study in analogue samples/healthy controls to investigate if the scenarios are effective in improving the respective target emotion regulation and social interaction function. The PhD project aims to recruit a computer science/mathematics student with the following required qualifications: Mathematical modelling and machine learning, advanced programming skills (Python, Matlab); interest in experimental psychology, ability to work in a multidisciplinary team and with external/industry partners. The student will be supervised by a multidisciplinary team of mathematicians/computer scientists (Professor Krasimira Tsaneva-Atanasova) a clinical psychologist and neuroscientist (Dr Anke Karl) and two external partners; a creative industry partner (James Richards; http://chromatrope.co.uk) and a chartered clinical psychologist with expertise in management of severe mental health conditions who is also Head of Psychology and Practice of Devon Partnership Trust (DPT) (Dr Phil Self). Our industry/creative partner, James Richards from Chromatrope Ltd. contributes to this project in kind by supporting the development of 360 degree ecologically valid environments that form the basis of the training environments.

References:

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