ABSTRACT
In this demonstration we show an Augmented Reality (AR) system we are developing for exposure treatment. AR has great potential for phobia treatment because virtual fear stimuli can be shown in the real world and the client can see their own body and interact naturally with the stimuli. However, advanced natural interactivity has so far not been fully implemented in AR based exposure therapy systems. Our AR exposure treatment system has a better integration of the real environment and the user into the system, and recognizes natural user actions as system input. Using the Microsoft Kinect device, we create a model of the therapy environment and the user’s body. This information is used in conjunction with a physics simulation engine to create a virtual spider that reacts to the real environment in a realistic manner. The virtual spider can walk up, around, or behind real objects and can be carried, prodded and occluded by the user. We describe the system and present the iterative development of our framework including an improved gesture library for improved interactivity.

Categories and Subject Descriptors
H.5.1 [Multimedia Information Systems]: Artificial, augmented, and virtual realities; J.3 [Life and Medical Sciences]: Health

General Terms
Human Factors

Keywords
Augmented Reality, Therapy, Spider Phobia

THE DEMONSTRATION
Research has shown that Virtual Reality Exposure Treatment (VRET) is an effective tool to help treat specific phobias, such as fear of small animals, fear of flying, etc. While immersive virtual environments have been designed and extensively studied for phobia treatment, Augmented Reality (AR) based therapy systems have received less attention. Augmented Reality Exposure Treatment (ARET) systems can display virtual fear stimuli in the real world and so allow clients can use their own body to interact with it. Studies have found that simple ARET systems are capable of inducing high levels of anxiety, which is a necessary prerequisite for such a system to be effective.

We are developing an interactive augmented reality framework for the exposure treatment of arachnophobia (the fear of spiders). Our system uses an overhead Kinect camera to obtain information about the therapy environment, enabling virtual spiders to interact with the real world in a very realistic fashion. The spiders can walk up, around, or behind real objects and can be carried, prodded and occluded by the user. While virtual exposure therapy is not new, no previous system has achieved the level of interactive realism that our work does.

Our system aims to give the therapist much more control over the stimulus compared to traditional (non-virtual) exposure therapy. The size, speed, appearance and number of the spiders can be adjusted. Future work will also allow the spider’s behaviour to be controlled to suit the stage of therapy.

The first author is demonstrating the system. We are encouraging attendees to try the system and to give feedback.