

Project Details	
Project Code	MRCPHS24Ex Vaughan
Title	Virtual Reality Toolkit for Diabetes
Research Theme	Population Health Sciences
Summary	A novel Virtual Reality (VR) toolkit for diabetes will be developed. This aims to benefit 415 million people with diabetes worldwide. The VR toolkit will benefit: (1) People with Type 1 and 2 diabetes, by helping with prevention, treatment, care, management and education. (2) NHS clinicians, through VR training modules incorporating key techniques and scenarios. This PhD has opportunity to build on state of art VR for diabetes.
Description	<p>This PhD will develop a novel Virtual Reality (VR) toolkit for diabetes clinicians and patients. We conducted a thorough literature review on Virtual Reality for Diabetes as foundation for the project. This identified that VR for diabetes would be beneficial, for both clinicians and people with diabetes, for education, treatment, management and prevention of type 1 and type 2 diabetes. Currently, no VR tools are available to cover all identified scenarios for people with diabetes and clinicians. The VR toolkit will include 4 novel tools for diabetes, which comprise 4 project objectives: For people with diabetes, this VR diabetes toolkit is for use at home or in a care setting. It will have wide application as 415 million people are living with diabetes worldwide, which is 1 in 11 of the world's adult population. This includes in USA and China where diabetes is highly prevalent and diabetes affects people of all backgrounds. The VR toolkit will benefit these aspects of diabetes care and management for people with diabetes: (Obj1) Exercise training in VR, specialised for people with Type 1 diabetes (T1D). Exercise is important for healthy management of Type 1 and prevention in Type 2 diabetes. Exercise often causes hypoglycaemia for people with T1D. The VR will enable people with T1D to learn and practice how to exercise safely, following the ADA guidelines, whilst avoiding hypoglycaemia. This will overcome common barriers to exercise, including fear of exercise-induced hypoglycaemia. This will simulate diabetes management around both aerobic and anaerobic exercises, which affect blood glucose differently. (Obj2) VR for people with newly diagnosed diabetes: VR training on how to perform unfamiliar diabetes management tasks, including: finger-prick, carb counting, food advice, how to manage continuous glucose monitoring (CGM) devices, how to respond to high or low blood glucose. The student will have freedom to develop these in any order, targeting specific areas identified in focus groups as high impact. For NHS clinicians and consultants in diabetes (in university hospitals or NHS training), the VR tools would be useful throughout the UK which has 168 NHS Trusts: (Obj3) VR enabling clinicians to practice life-threatening emergency situations. This includes rapidly responding to a patient's blood glucose level when very high (hyper-glycaemia) or low (hypoglycaemia) to improve time-in-range (TIR). (Obj4) Providing automated objective-based scoring to support learning of clinicians based on their assessed clinical skill levels and the actions clinicians take within the VR patient scenarios to manage diabetes conditions. The project involves expert collaborators in addition to 4 main supervisors: Dr Sarah Sauchelli Toran, Bristol University NIHR Biomedical Research Centre</p>

	(BRC) and Patient-Centred Outcomes Assessment group at RTI-Health Solutions, Manchester – contributing patient & public involvement and focus groups. Prof Danae Stanton Fraser, Bath University, Lead and Director of CREATE VR Lab, mentor for ECRs. Prof Rob Andrews – Exeter University, and Taunton NHS consultant clinician - contributing specialist on diabetes education & exercise, opportunity to use VR with his diabetes patients & clinician feedback. All our collaborators and supervisors contribute to student skills, development and PhD experience. The project is highly interdisciplinary involving NHS consultants, computer scientists and psychologists. Focus groups of a co-design phase with involvement of patients and clinicians will be embedded within the project developed phases, to ensure the VR toolkits are developed according to NHS requirements. This VR diabetes system will aim to: (1) improve the way clinicians and patients approach diabetes care and interventions, (2) transform patient care for diabetes which has growing numbers of patients throughout the world, (3) enable swift implementation for NHS use.
<b>Supervisory Team</b>	
<b>Lead Supervisor</b>	
Name	Professor Neil Vaughan
Affiliation	Exeter
College/Faculty	Faculty of health and Life Sciences
Department/School	Department of Clinical and Biomedical Science
Email Address	n.vaughan@exeter.ac.uk
<b>Co-Supervisor 1</b>	
Name	Dr Alexandra Voinescu
Affiliation	Bath
College/Faculty	Faculty of Humanities and Social Sciences
Department/School	Human Computer Interaction (The CREATE VR Lab), Department of Psychology
<b>Co-Supervisor 2</b>	
Name	Dr Mohammad Al-Amri
Affiliation	Cardiff
College/Faculty	School of Healthcare Sciences
Department/School	Sensor Physiotherapy Intervention (SPIN) Research Group
<b>Co-Supervisor 3</b>	
Name	Dr Christof Lutteroth
Affiliation	Bath
College/Faculty	Faculty of Science
Department/School	REal and Virtual Environments Augmentation Labs (REVEAL), Department of Computer Science.