Details of Grant

EPSRC Reference:	**EP/P015743/1**				
Title:	**Maximising cavitation to clean dental implants**				
Principal Investigator:	**Walmsley, Professor D**				
Other Investigators:	**Wang, Dr QX**				
Researcher Co-Investigators:					
Project Partners:					
Department:	**Dentistry**				
Organisation:	**University of Birmingham**				
Scheme:	**Standard Research**				
Starts:	**01 July 2017**	Ends:	**30 June 2020**	Value (£):	**628,265**
EPSRC Research Topic Classifications:	**Acoustics**		**Med.Instrument.Device& Equip.**		
EPSRC Industrial Sector Classifications:	**Healthcare**				
Related Grants:					

Panel History:

Panel Date	Panel Name	Outcome
09 Feb 2017	**Engineering Prioritisation Panel Meeting 9 and 10 February 2017**	**Announced**

Summary on Grant Application Form

Dental implants are an exciting procedure which replaces a patient's lost teeth. However bacteria in the mouth will grow on the metal surface leading to gum disease. If not removed it will lead to loss of this expensive treatment. It is a huge worldwide problem and currently no methods exist that remove the bacteria effectively. Ultrasonic scalers are an everyday instrument used by dentists to clean teeth. The vibrating metal probe generates bubble activity when used with water. This bubble activity is termed cavitation and could be used to vigourously scrub the implant surface removing the bacteria. Our previous work shows that the bubble activity can work but it is too slow for clinical use. Clinicians like this idea but want it to work quickly and effectively.

To solve current and major problem associated with cleaning of implant surfaces, we have brought together a unique team of dentists and mathematicians which we have called "DENTaMATHics". We have planned three new designs or improvements to the current ultrasound scaler: to improve the tip shape and operation conditions, to implement cavitation prone liquids, and to implement shield-cover design to a scaler tip. The shield-cover will prevent the metal probe from contacting implant surfaces. It will also direct a jet containing oscillating bubbles generated to implant surfaces with the water flowing through the handpiece. These three novel designs will be developed using the state-of-the-art experimental and computational capabilities and together they will dramatically improve the efficacy of ultrasound cleaning. We will call this a non-touch approach. This new design of ultrasonic scaler will be very attractive to industry and before approaching the manufacturers we will patent the idea and set up our own spin out to manufacture our in-house designs. We are confident that these outputs will be used clinically, solving an

important global challenge. It will benefit patient treatment and maintain their quality of life provided by the implant treatment.
Key Findings
This information can now be found on Gateway to Research (GtR) http://gtr.rcuk.ac.uk
Potential use in non-academic contexts
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Impacts

Description	This information can now be found on Gateway to Research (GtR) http://gtr.rcuk.ac.uk
Summary	
Date Materialised	

Sectors submitted by the Researcher
This information can now be found on Gateway to Research (GtR) http://gtr.rcuk.ac.uk

Project URL:	
Further Information:	
Organisation Website:	**http://www.bham.ac.uk**