



# **Surface Texture of Bioimplants**

### **Background**

Artificial joint replacement is regarded as one of the most important operations in the past decades, which helps patients relieve pain and restore daily life. Nowadays, the general lifespan of a commercial product is approximately 15 years, which is short for the demand of potential consumers. This short in-vivo longevity is highly attributed to the aseptic loosening, induced by the wear particles.

### **Industrial demands**

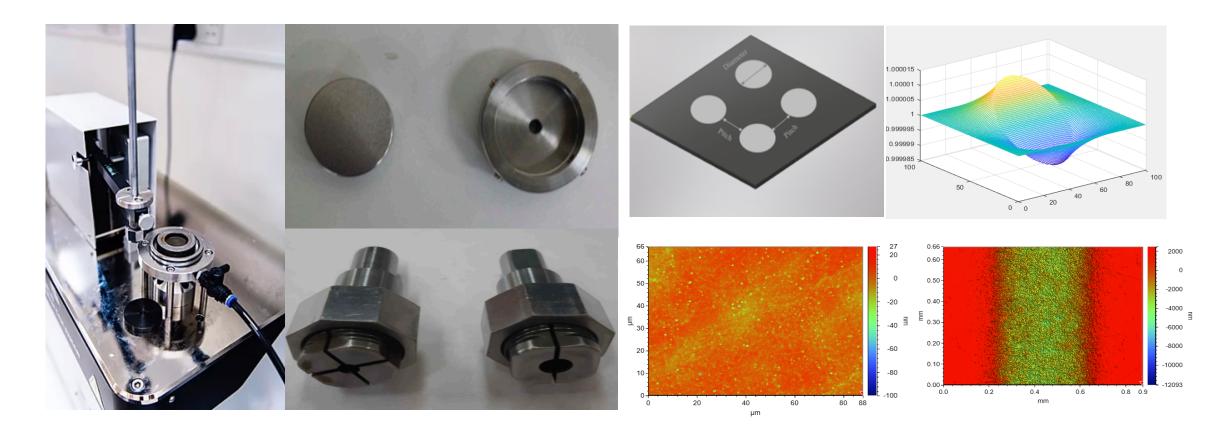
Considering the ageing population as well as the demand of younger population, 15 years' in-vivo service time generally means the requirement of second replacement operation for some patients. The need for a device lasting longer is urgent for both industry and patients.

## New approach

Surface texturing can be an effective approach to improve the tribological performance of a bearing couple. The specially-designed micro patterns could help increase the longevity of bioimplants by trapping wear particles and increasing the thickness of lubricant film.

## **Progress and results**

FDM model, based on the Reynolds equation, has been built to analyse the functionality of hydrodynamic pressure on the textured bioimplants. Meanwhile, a novel working mechanism of texture pattern is under investigation. Groove pattern and dimple has already been tested using pin-on-disk tribometer, which shows a huge improvement in tribological performance.



Centre of Micro/Nano Manufacturing Technology (MNMT-Dublin), UCD, Belfield, Dublin, Ireland Tel: +353 (0)1 716 1810 Fax: +353 (0)1 283 0534 E-mail: fengzhou.fang@ucd.ie