PhD Studentship: Application of deep neural network for synthetic medical implants

Project description

Recently, deep neural networks have shown promising results in creating 3D objects. Additionally, recent advances in 3D printing technology confer extra design freedom on the fabrication of porous scaffolds with desired geometries and porosities. These scaffolds provide mechanical and biological environments closer to the host tissue. The ability to engineer endogenous healing cascades in bone implants is largely dependent on a facilitating micro-environment suitable for morphogenesis within the cells of the implant. These parameters are mainly governed by the porous material, pore size and shape. This PhD research project aims to apply deep neural networks to enhance the accuracy of 3D printing geometry to replicate complex anatomical shapes with cubic crystal unit-cells. The framework presented here is based on epithelial cell mechanics, to balance the combination of critical parameters in the design of bone implants by incorporating deep neural network. The successful candidate will have access to the computing facility, and high-quality 3D printers at DMU to perform the research.

Funding

DMU is offering a fully-funded 3-year PhD scholarship for this work, **commencing on 1st October 2021**. The stipend is pegged to the UKRI rate, currently at £15,609 per annum. **Lead Supervisor** is Dr Aboozar Taherkhani (aboozar.taherkhani@dmu.ac.uk)

Applicants must:

- Possess a UK Honours degree with at least an upper second class (or overseas equivalent) in computer science, and electrical engineering or other related fields, a Masters Degree or an academic or professional qualification plus experience in their sector or industry.
- Demonstrate competence in the use of the English language. Please see section 5b here for further details on meeting our English language entry criteria.

Preferred requirements:

- Experience in coding in one of computer languages such as Python or C++.
- Familiar with developing deep learning using PyTorch, Keras, TensorFlow or other frameworks
- Knowledge of 3D printer machine and fabrication scaffolds

How to apply

Please go to the scholarships page which outlines the 2-stage process for applying for these scholarships.