

2 MSc positions are available in the Shock Physic and Chemistry Lab (<https://shock.bit.edu.cn/Home/index.htm>) in Beijing Institute of Technology. The research topic is in the area of mechanics of biomaterials. Theoretical and computational modeling along with 3D printing and experimental characterization will be conducted for a better understanding of the mechanical behavior of bioceramics. The candidates will work under the supervision of Dr. Xie Jing and Dr. Ali Arab. We will support the successful candidate for applying the CSC program.

➤ **Project 1.**

Additive manufacturing of the bioceramics

Digital light processing (DLP) method will be used in this research for fabrication of scaffold bone. DLP process consists of the following main steps: preparing a suitable photocurable ceramic suspension, the building of the ceramic part, debinding, and sintering. The influences of DLP conditions in each step, including the dispersion, processing parameters, and sintering temperature will be systematically investigated to have scaffolds with appropriate mechanical strengths and biological properties.

Objectives:

- Find and study the effective parameter in the AM bone fabricated by the DLP technique
- Study the mechanical properties of printed sample and develop the consecutive model for printed sample

Requirement:

- Bachelor degree in materials or mechanical engineering
- Interested in the additive manufacturing
- High undergraduate GPA
- Proficiency in English (IELTS 6)
- A candidate who has experience in mechanical testing & microstructure characterization is preferable.

➤ **Project 2.**

Computational modeling of the bioceramics especially under the dynamic loading

Using the commercial finite element software, such as Abaqus/ANSYS, to simulate the dynamical mechanical behavior of 3D printing bioceramic under different strain rates. Comparing the experimental and the simulation results to improve the model, and design a desirable bioceramics structure for better biomechanical compatibility.

Objectives:

- Develop a feasible and robust finite element model for the investigation of the dynamical behavior of

bioceramic under the dynamic loading

- Obtain the dynamic mechanical properties of 3D printing ceramic
- Design and verify a new structure of bioceramic with a higher specific strength ratio

Requirement:

- Bachelor degree in mechanical engineering
- Strong interest in finite element method, wave propagation, solid mechanics, and programming
- Proficiency in English (IELTS 6)
- A candidate who has experience in Abaqus/ANSYS/MATLAB is preferable.

Interested candidates should send their CV, contact information for up to two references, and a one-page cover letter to Dr.Jing Xie (jxie@bit.edu.cn) and Dr.Ali Arab (arabali83@yahoo.com).