**Title:**

Biomechanical experiments and modeling of screw-plate fixation implanted on fractured femur for the purpose of pre-surgical planning

**Abstract:**

Several types of implant, plate and screw, have been developed for the corresponding bone fractures at different sites. In order to understand the mechanical behavior of bone-plate and to give surgeons some suggestions of selecting screw positions, this study builds an APP to provide the pre-surgical planning using CT-based finite element model. This model was validated against the compression test of synthetic sawbones. Furthermore, the specific APP was established using COMSOL application builder to calculate the stress and strain of implant under different screw positions. This APP reveals the number and location of screws affected the stress distribution of the implant. Another approach, the genetic optimization, is also investigated to give an identical assessment of number and location of screws. These approaches can provide preliminary information for clinicians before surgery.