

Strengthening of titanium and titanium alloys via severe plastic deformation. Application of titanium and its alloys for new generation of dental implants.

M.Sc. Eng. **Jakub Kawałko**

Supervisor: Professor **Krzysztof Sztwiertnia**, D.Sc., Ph.D.

Main task in PhD research is the investigation of deformation mechanisms and impact of parameters in complex loading deformation process on titanium and its alloys for biomedical applications. Selection of PhD research area is dictated by current need for new, strengthened biomaterials for applications in new generation of functional dental implants.

Undertaken research subject is realized by investigation of microstructure, mechanical properties, thermal stability and surface properties of titanium deformed plastically in forming process with complex loading scheme and processed with specific electroerosion machining method.

Materials are plastically deformed by means of KoBo method. KoBo method consists of simple extrusion combined with constant changing of deformation path induced by reversible rotation of extrusion die. This type of complex loading changes the material deformation type to heterogeneous visco-plastic flow and decreases extrusion force of forming process allowing for low temperature deformation of metals up to high strains.