(1) **Shape memory alloy (4 students)**
Shape memory alloys are a special group of metallic materials that have the ability to change their shapes automatically when the temperature is changed. In this project we will look into means to improve these properties and to understand how it works. The project will involve materials handling, phase heat treatment analysis, transformation and mechanical testing. It requires (or you need to learn) good knowledge of materials engineering, solid phase transformations, thermodynamics and general skills in mechanical testing.

(2) **Electrochemical fabrication of nanostructures (3 students)**
In this study we look into various means to create nanostructures on metal surfaces by means of electrochemical processing. Typical examples include electrochemical anodisation of Al to form nano-channelled Al2O3, porous SnO2, and electrochemical deposition of metallic nanowires. It requires (or you need to learn) good knowledge in chemistry, electrochemical testing, electron microscopy, and nanomaterials.

(3) **Thin film materials for microelectromechanical system devices (2 students)**
Micro-electro-mechanical system devices are miniature devices (typically tens of micron meters in dimension) that perform a certain function, for example micropumps, microsensors, microactuators, and microfilters. Such devices are fabricated using thin film materials, typically below 1 micron meter in thickness. These materials have very different properties from their bulk material counterparts, so we need to find ways to determine their properties and to characterise their structures. This project requires (or you need to learn) nanomaterials and electron microscopy.