

# Bachelor Thesis

**Topic:** Effect of Cr and combination of Cr+Zr on the mechanical properties and structure of Al-Mg-Si-Mn alloys

**Commencement:** asap

**Abstract:** Higher mechanical properties are required for Al alloys due to its wide applications in the highly technological fields (automotive, marine, aerospace, chemical and other industries).

Particular interest in heat treatable Al-Mg-Si aluminum alloys is due to the ability to modify solid solution and thereby improve mechanical properties. The hardening effects arises as a result of interacting dislocations with the precipitates, which act as obstacles to the dislocation motion.

Generally, transition elements (such as Cr, Zr) in Al alloys form precipitates or crystallize as intermetallic compounds because of their poor solubility in aluminum. Therefore small additions of transition elements have large influence on the properties of Al alloys.

However, simultaneous modifications of chemical composition and heat-treatment and their effect on the mechanical properties of Al-Mg-Si alloys have not yet been investigated.

The main task of the thesis is to elucidate influence of Cr and combination of Cr+Zr on the mechanical properties and structure of Al-Mg-Si-Mn alloys.

This investigation will be performed by an examination of microstructural properties, including chemical composition at the micro-scale, as well as measurements of mechanical properties.

**Location:** WTM Erlangen

**Supervision:** Oleksandr Trudonoshyn oleksandr.trudonoshyn@fau.de

Group leader: Peter Randelzhofer

Professor: Dr.-Ing. habil. Carolin Körner

