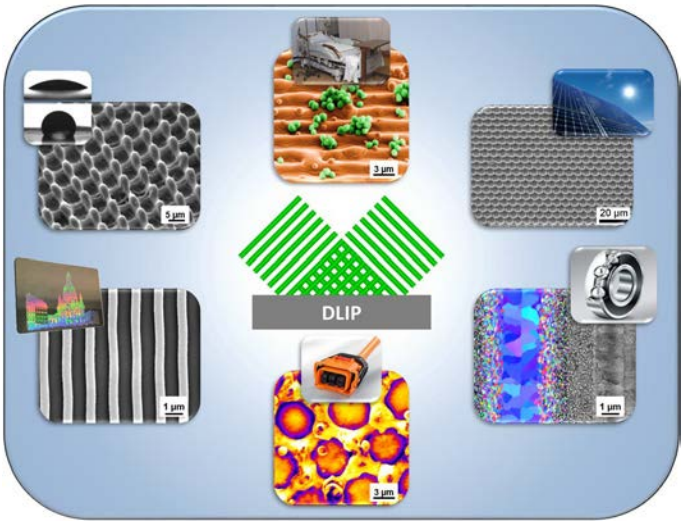
Univ.-Prof. Dr.-Ing. Carsten Gachot

invited lectures at Belgrade University,
Mechanical Engineering Faculty,
Kraljice Marije 16, Belgrade, Serbia

Lecture 1: Monday, May 07, 2018, 13^{00}, room 211 (central room, 2^{nd} floor)

Laser as a versatile tool for high-performing engineering surfaces and materials´ microstructures for tribological applications

Recent advancements in laser technology opened completely new areas of research and applications. High power pulsed laser systems but also the further development of systems with ultra short pulsed lasers with reasonable energy output and high repetition rates are interesting for tailoring material surfaces and due to their versatility and industrial robustness a proper choice for the integration in production lines. Engineered surfaces by laser methods are particularly interesting for applications, which deal with friction and wear. Over the decades, many research projects were launched concerning the effectiveness of for example surface texturing under different frictional conditions and lubrication regimes such as hydrodynamic, mixed or boundary lubrication. Although there has been progress in the fabrication of precise surface textures and modeling of their influence, many conflicting reports still exist concerning the effectiveness of surface texturing under certain contact conditions.



Within this research talk, a critical review about past, present and future trends concerning surface texturing should be provided. First, the strengths and weaknesses of various fabrication methods will be discussed. Subsequently, the effects of surface textures under the apparent lubrication regimes in the Stribeck curve, with a clear distinction between conformal- and non-conformal contacts, will be presented. Finally, a summary of the fabrication methods will be given with respect to their typical feature sizes, costs, and processible materials.

Lecture 2: Wednesday, May 09, 2018, 13^{00}, room 514 (seminar room, 5^{th} floor)

Loss of lubrication in helicopter gears – How to prolong lifetime

Loss of lubrication in rotorcraft gearboxes has been investigated since 70s from the battlefield experiences especially in helicopter transmission technologies of that time. In the past, expensive system level experiments were conducted in order to understand the severity of oil loss condition in helicopter transmission. Computer aided models were developed to simulate such environment to understand the performance of rotorcraft transmission components. Research attempts were also made to mitigate the oil starvation condition using emergency or auxiliary lubrication system, which imposes additional weight on the payload. Recent studies are more focused on improving the loss of lubrication conditions in terms of using materials and lubricants that are more stringent to operate under severe loading conditions. This talk comprises most of the efforts carried before and current research activities especially on rotorcraft transmissions under loss of lubrication.