In the view of **emerging global problems** with an environmental pollution and limited amounts of non-renewable fossil fuels, an achievement of optimal efficiency and economy of power&energy systems is one of **the biggest current challenges** that scientists and engineers have to face with. It has been already well recognized that increasing of operating temperature is the best way to improve efficiency of power units. A good example of such a case are gas turbine engines. It was documented that reaching of T=1700°C at the turbine would result in an achievement of its efficiency up to 90% and overall thermal efficiency up to 40%, what in turn would be reflected in both economical (a lower fuel consumption, a longer aircraft flight ranges) and ecological (a lower environmental pollution) benefits. However, the possibility of using such harsh conditions is strongly determined by performance properties of involved structural materials. During the last decades, few consecutive generations of nickel-, cobalt and iron-based superalloys have been designed and developed as the materials for gas turbine applications. Although the significant progress has been achieved by introduction of directionally solidified or monocrystalline materials, the working temperature of turbine blades >1500°C is still out of the question, while a further improvements by using metallic materials is rather problematic. This limitation is mostly a direct consequence of insufficient high temperature mechanical strength of superalloys. Therefore, an extensive research on new structural materials able to extend the working temperature ranges, has been started all over the world.

Among various considered candidates, a special attention has been paid to a development of molybdenum based materials like molybdenum silicides. However, one of the main drawbacks that hinder a wider commercial development of molybdenum silicides is their unsatisfactory creep strength and oxidation resistance. Based on reported literature data it is concluded that this drawback coming from a high volatility of molybdenum oxides, might be significantly suppressed by a proper modification of alloy chemical composition (i.e. **a multiphase design of Mo-Si-B alloys**). Although a fabrication of such materials has been investigated by numerous researchers, **already proposed methods are complex (multi-step in nature, involving extreme processing conditions) and thus expensive**. In this Project, we will explore **a novel liquid-assisted technological approach that allows receiving Mo-Si-B materials in much simpler way, and at the same time giving better materials properties**. For this purpose, a new experimental knowledge on high temperature wettability, spreading and infiltration in Si-B/Mo-based systems will be established. This knowledge will be subsequently verified in series of technological trials. Consequently, both the proof of concept and a number of findings and practical recommendations for fabrication of novel high strength and oxidation resistance ultra-high temperature materials, will be formulated.