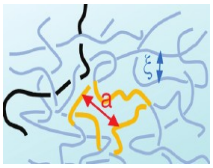

Complex liquid is a fluid with immersed multi-atomic particles. A common example of complex liquid is human blood, which - roughly speaking - consists of red blood cells immersed in plasma. Important example of complex liquid is cell cytoplasm. This project goes along scientific research of which the goal is to answer the following question: what is the relation between structure of complex liquid on micro scale – where multi-atomic particles forming the liquid can be seen – with observable flow properties and diffusion of immersed in complex liquid particles.

This project is related to the following two aspects of the above question. The first goal of the project is to describe behavior of diffusing particle in complex liquid. The main task is to introduce relation between diffusion of the particle and structure of complex liquid. It is of great practical importance, because properties of complex liquids are often investigated by observing under a microscope small particles immersed in liquid (probe particles).

Second aspect of the project concerns the relation between structure of complex liquid on micro scale and its flow properties. One of the basic flow properties of complex liquids is viscosity. The goal of the project is also to formulate new method of calculation of flow characteristics such as viscosity, basing on micro structure of complex liquid. Within the project, new method will be formulated in context of suspensions of spherical particles. Novelty of this project relies on new approach, which is based on scale-dependent viscosity. Obtained theoretical results will be verified by comparing them with results of experiments and numerical simulations. Theoretical investigations and experiments will be performed by the principal investigator, whereas numerical simulations by Dr. Gustavo Coelho Abade, who is an expert in the field of numerical simulations of suspensions. International collaboration within the project will involve Prof. John Brady from California Institute of Technology in USA. The results will significantly improve understanding of flow and transport in living cells and deliver basis for understanding of the relation between microstructure of particles forming complex liquid with its observable properties and viscosity - which is of great importance in production of many substances, including cosmetics and food products.