Several scientistis from two academic centers decided to join their forces in search for novel agents against pathogenic microorganisms. The joint project takes advantage of combination of computational as well as experimental methods. Series of novel phenylboronic compounds including 3-substituted benzoxaboroles will be obtained and their antimicrobial activity studied *in vitro* as well as *in silico*. The objective of the proposed project is not only to answer the question "whether" the investigated phenylboronic compounds are microbiologically active but also "why", or "how" do they actually act. To answer those questions two complementary approaches will be applied. First, a variety of proposed model compounds will be prepared and their antimicrobial activity studied. Second, the *in silico* studies of molecular interactions between model compounds and active sites of enzymes will be carried out. Such a comprehensive approach should result in deep understanding of the mechanism of biological activity of studied molecules. It should also allow rational design and development of novel powerful animicrobial agents.