

## **Multiscale surface functionalization of blood contacting materials**

M.Sc. Eng. **Aldona Mzyk**

Supervisor: Professor **Bogusław Major**, D.Sc., Ph.D.

Co-supervisor: **Roman Major**, Ph.D.

The challenge in modern implantable cardiovascular devices development is highly related to the biocompatibility improvement through manufacturing surfaces mimicking extracellular matrix components. The above mentioned idea facilitates covering an internal part of the implant by ECM-like scaffold and then reconstruction of cellular layer which mask the material from an inflammatory response. Herein, the most promising approach refers to application of porous polyelectrolyte films created with a "layer by layer" technique using electrostatic interactions. The aim of research is multiscale surface functionalization of polyurethane elements by polyelectrolytes and their further modification by cross-linking, an introduction of gold/silver nanoparticles to provide antimicrobial properties and incorporation of alginate microcapsules as a carriers of growth factors. Searching for new type materials for multilayer coatings fabrication by LbL method is also one of the main interests.