The application potential of odour biosensors is related to their usefulness in medical diagnostics, food quality control, environmental monitoring and other industries where odorants are present. An increase in knowledge on the mechanisms concerning odour perception in the biological olfactory systems is accompanied by a significant progress in the field of odour biosensors. A milestone was the discovery of genes coding receptor proteins, of the rhodopsin-like family, which interact with a particular chemical substance. Biosensors or biosensor arrays, are devices, which soon can become supplementary to the classic analytical techniques. Progress in the field of electronic analogues of the biological olfactory systems is closely related to the development of construction materials for sensors.

Intensive development of biosensors is aimed at elaboration of biosensors with a high sensitivity/selectivity and shorter response time, biosensor systems generating signals similar to those occurring in their biological counterparts, bioelectronic systems mimicking human nose or brain. Apart from typical biological components of the olfactory systems, the odour biosensors utilize the structures mimicking biological materials such as synthetic peptides. The structure and characteristics of these materials are designed to simulate the binding sites in the olfactory receptors, which are responsible for biding odorous molecules. An important issue in the construction of the biosensors is their lifetime and repeatability associated with effective immobilization of the biosensing materials on the secondary transducer. The ease of peptides synthesis *via* modification of side chains of amino acids allows simple improvement of affinity with respect to particular odorants. A peptide can be immobilized on the sensor's surface without the lipid bilayer. Additionally, the possibility of storage of peptides in refrigerator for a few months and stability of the immobilized sensitive layers make these materials the most suitable for implementation in commercial odour biosensors.

My research studies concerning characterization of the influence of the length and composition of peptides chain on biosensor detection parameters. The main goal of the project is to investigate the occurrence of characteristic interactions between selected receptors (synthetic peptides) and ligands (odorant copmpounds). Owing to the ease of modification of the peptide chain during the synthesis, it will be possible to increase the affinity of the peptide to the ligand, which will increase metrological parameters of the constructed odour biosensors. The current state of knowledge in the field of odorant biosensors with the active element as synthetic peptides, is limited. The implementation of this type of compounds as a receptor layer will significantly increase the range of possibilities for biosensor development. The main obstacle in peptide-based biosensor design is optimization of the effect of polypeptide chain length and composition. The implementation of this type of biological material as a sensor receptor layer will allow determining the degree of affinity of selected peptides for particular groups of compounds. It will also expand the field of knowledge on synthetic peptides for odorant biosensor development.