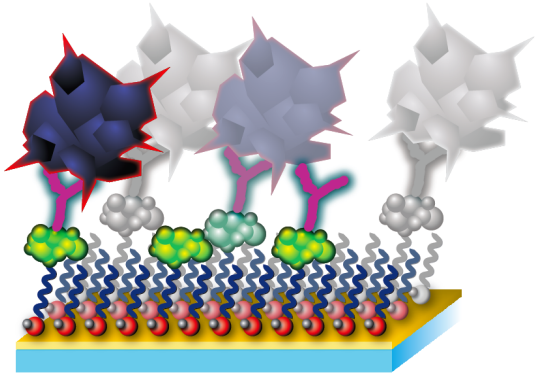
My main expectation for the RET program was to learn about photonics and biophotonics technologies so that I could share my knowledge and skills with my students and colleagues after the completion of the program. Before we started working on our RET project, my partner and I knew very little about the project's specifics. I thought that our project would be related to the interaction of various types of radiation with biological tissue. Indeed, it was related to the interaction of radiation with biological tissue, but the main focus of our lab work was "wet" chemistry.
Our group worked with the scientists who developed a biosensor that detected viruses using surface plasmon resonance.



This biosensor is composed of a light-transmitting substrate coated with antibodies whose optical properties change if the antibodies capture a virus. While shining a beam of light at the sensor, the scientists expose the sensor to a potentially virus-contaminated substance. By observing the change in the properties of the transmitted light it is possible to determine how much, if any, of a virus is present in the tested substance.

In our RET project, we had to investigate factors that could affect the formation of an intermediate layer of organic molecules between the antibodies and the gold-coated substrate. Such factors were the time of incubation of a substrate in a solution of an organic acid in ethanol and the concentration of the acid in a solution. We analyzed the prepared layers using Fourier transform infrared spectroscopy and ellipsometry. The conducted studies allowed us to conclude that relatively low concentrations and short incubation times can be used for successful layer formation on gold-coated substrate.
In the beginning of the program, we were briefly introduced to the substrate preparation protocols and then we had to master cleaning gold-coated substrates, preparing self-assembled monolayers, and taking measurements with a spectrometer and an ellipsometer independently.

While gaining the necessary experimental skills, we had to acquire the matching theoretical knowledge by mining the Internet for publications related to our research. Sieving the Internet for relevant materials was a challenge, taking into consideration the high conceptual level of physics, chemistry, and mathematics involved in the development of biosensors and the vast amount of information on the Internet. At the same time, it was a valuable learning experience, and it brought our knowledge of biophotonics to a relatively high level.

I truly enjoyed the program, and I highly recommend it to everyone interested in expanding their horizons of scientific knowledge.