



<i>Project Title:</i>	<i>Preparation and Characterization of Biointerfaces</i>
<i>Project Short description</i>	<p>A typical objective of preparing molecular biointerfaces is to develop a procedure for controlled attachment of biological molecules, such as DNA, peptides, proteins, antibodies, to an inorganic or synthetic surface and to preserve the functionality of the biomolecules after the attachment. Working with biointerfaces is, therefore, intrinsically interdisciplinary as expertise and methods from biology, chemistry, and physics have to be combined to design an appropriate biointerface, to develop a procedure for preparing it and to characterize its properties. Before a realistic biointerface can be prepared, often a simplified model system is developed and systematically analyzed to provide better understanding of the more complex real system.</p> <p>Working with such model systems provides an excellent opportunity for a Master's project, as it involves learning how to plan and perform systematic experiments and how to analyze the data obtained from characterization measurements using several techniques. Depending on the background and scientific interests of a student, a project can focus on preparation, characterization, or data analysis aspects of the work, so that the student has the possibility to systematically learn the necessary background and carry out the project during the research phase of their Master's studies.</p>
<i>Expected Start/end date</i>	open
<i>Required degree and Background knowledge of students, minimum grade point average, etc...</i>	<p>The interdisciplinary nature of biointerface research provides possible project topics for students with different background knowledge and interests. Background in chemistry is required for developing surface functionalization protocols. Biochemistry and/or molecular biology are required for developing and testing biofunctional properties. Physical chemistry and/or physics are required for projects focused on characterization methods, while data analysis and modeling projects require physics and mathematics. For experimental projects basic skills for working in a chemical or biological “wet” laboratory are required. Prior experience with analytical instruments, quantitative measurements, and basic statistical analysis is strongly recommended.</p> <p>The specific systems and techniques will be selected for the project in consultation with the home institution advisor and may include working with DNA, peptides, proteins, antibodies, and related molecules as well as polymers and organic molecules. Analytical instrumentation available at INL includes QCM, spectroscopic ellipsometry, XPS, FTIR, UV-vis, CD, DLS, SEM, and other complementary methods.</p>

Supervisor at INL

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