



<i>Project Title:</i>	<i>Characterization of Nanoparticle-Cell Biointerfaces</i>
<i>Project Short description</i>	<p>Interactions of nanoparticles (NPs) with cells is of critical importance for nanomedicine and for other biomedical applications that take advantage of NPs for labeling, imaging, diagnostic, or therapeutic purposes. This research topic is, therefore, intrinsically interdisciplinary as expertise and methods from biology, chemistry, and physics have to be combined for understanding NP-cell interactions and biointerfaces.</p> <p>Working with NPs and cells provides an excellent opportunity for 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, for example, on analysis and optimization of NP properties for interactions with a particular type of cells or on the characterization of NP-cell interactions, 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. The duration of the project and prior experience of the student will determine the choice of the cells to be investigated.</p>
<i>Expected Start/end date</i>	open
<i>Required degree and Background knowledge of students, minimum grade point average, etc...</i>	<p>Working knowledge of the cell system to be investigated is a critical requirement, as the duration of the project will not be sufficient to become proficient in working with cells without prior experience. Experience and interest in physical and chemical analytical methods as well as microscopy is strongly recommended, as characterization will have to be performed for NPs and cells both separately and in combination. Experience working in a chemical or biological “wet” laboratory is required, knowledge of basic statistical analysis is strongly recommended. For projects involving extensive use of optical or electron microscopy, prior experience will be important as complete training in these techniques will not be possible during the project. The specific systems and techniques will be selected for the project in consultation with the home institution advisor and may include working with functionalized gold or iron oxide NPs and bacterial or mammalian cells. Analytical instrumentation available at INL includes UV-vis, DLS, SEM, XPS, FTIR, CD, and other complementary methods as well as an automated cell sorter and flow cytometer system and a variety of optical microscopes.</p>

Supervisor at INL

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