Two-dimensional (2D) materials have emerged as a promising class of layered materials for optoelectronic applications and discovering novel physical phenomena [1]. Different materials can be combined in heterostructures with tailored optical and electrical properties. The assembly of such devices relies on the so-called mechanical exfoliation technique that also led to the discovery of graphene. In this method, micrometer sized flakes of 2D materials are exfoliated onto silicon/silicon-oxide (Si/SiO$_2$) substrates that enables flakes of different thickness to be distinguished easily in an optical microscope by their difference in contrast.

The goal of this project is to develop an automated setup that is able to identify flakes of different thicknesses on Si/SiO$_2$ substrates by analyzing the difference in optical contrast between the crystals and the substrate. A software code will be developed that is capable of processing images from the optical microscope as well as controlling a hardware setup that scans the stage with the sample holder.

Figure 1: a) - m) Optical microscope pictures of different MoS$_2$ flakes with various thicknesses. n) and o) Contrast difference of MoS$_2$ on SiO$_2$ versus layer number. [1]

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**Prerequisites**: Basic knowledge of computer programming and image processing.
