Summer Internship
Development of an interface in OpenGL for a 3D laser tool-machine

Description
3D Femtosecond laser machining has recently emerged as a capable tool for producing complex three-dimensional microstructures. In this 3D printing process, a multi-axis numerical control is used to program laser exposure trajectories in space that define vertices and surfaces of complex objects. The laser does not remove any material, but locally modifies its structure. The laser exposed-volumes are subsequently dissolved during a chemical etching step.

In this context, there is a need to develop a graphical interface - based on OpenGL - for fast visualizing these native trajectories as they are coded in the native language (PLC) of the controller. One objective will be to offer a realistic rendering of the final objects based on what is known from the laser-affected zones, like for instance taking into account its anisotropic nature that depends on exposure conditions.

Objective of the internship
During this internship, you will code the interpreter for translating native PLC commands into an OpenGL-based visualization engine. The visual tool should be customizable, so that it can adapt to various laser exposure conditions and beam shapes.

Required skills
Computer science background is needed and some experience in OpenGL would be a plus. Knowledge of interfacing computers with CNCs is an asset, but not mandatory.

Conditions
The Galatea Lab is based at the campus of EPFL/Microcity in Neuchâtel. This is a fulltime two-month internship over the summer months (July-August). Allocation of about 1600 CHF/month.

About the Galatea Lab
The Galatea Lab at EPFL is conducting research in the broad field of laser-matter interaction in the context of multiscale micro-manufacturing problems and system integration at the microscale. More information can be found here: http://galatea.epfl.ch/

Contact
Prof. Yves Bellouard, yves.bellouard@epfl.ch