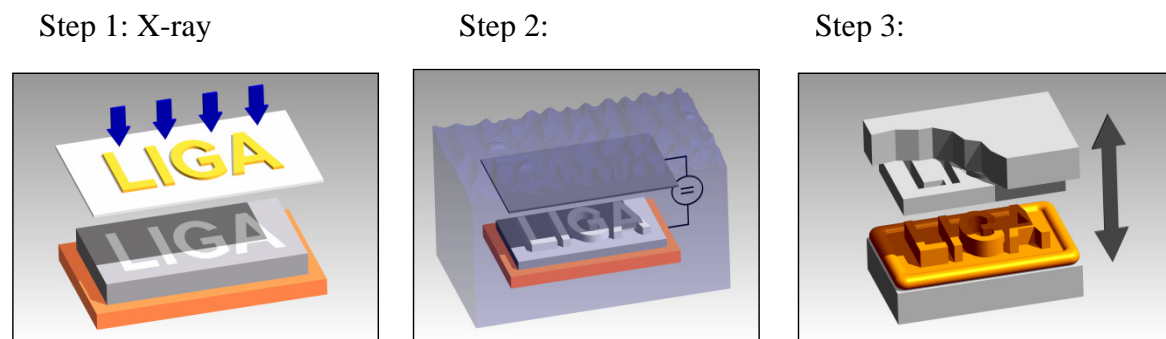


Synchrotron Laboratory for Micro and Nano Devices (SyLMAND)

SyLMAND will be a unique facility dedicated to research in and fabrication of polymer microstructures using X-ray Lithography (XRL). It will provide distinctive capabilities not currently available in Canada and be highly complementary to other existing and emerging facilities.

X-ray lithography (XRL) is a technique where highly collimated, high-intensity X-rays from a synchrotron are used as the lithographic light source for patterning X-ray sensitive polymer through a mask which contain the pattern to be transferred. In addition to fabrication opportunities available with direct X-ray exposure, devices can also be produced inexpensively using LIGA. After X-ray exposure and development, a metal is electroplated filling the voids. The electroplated structures can be used as individual metal micro-parts or used as moulds for replication in polymers and ceramics by hot embossing or injection moulding. The steps involved in fabricating micro-parts by LIGA are shown below.



Steps involved in fabricating micro-parts by LIGA

What really distinguishes XRL and LIGA from other techniques is the ability to define high-resolution high aspect ratio structures in thick materials (polymer/metals). In addition to being a more cost effective fabrication process, LIGA enables the use of materials with desirable properties such as increased toughness, high temperature inertness, chemical and biological compatibility, magnetism, piezoelectricity, etc. This allows a huge variety of micro-electro-mechanical systems (MEMS) applications in fields such as radio frequency MEMS, micromechanics, optics/photonics and biomedical.

The SyLMAND research group is actively involved in radio frequency microelectromechanical system (RF MEMS) and biomedical research. Together with partners from Canada and overseas, first demonstrators have been designed, fabricated and published. Once the SyLMAND facility is operational, comparable devices will be fabricated in Saskatoon. The construction phase of the SyLMAND facility is nearly complete and commissioning is in progress.