

<b>Research theme</b>	Rapid Prototyping
<b>Research title</b>	Open source powder based rapid prototyping machine
<b>Researcher</b>	Alex Budding
<b>Research period</b>	From May 2011 - July 2012
<b>Company</b>	University of Twente
<b>Supervisor</b>	Tom Vaneker

## *Background*

The designed and build machine is eventually used for printing alumina membranes for the research group Inorganic Membranes of Chemical Engineering.

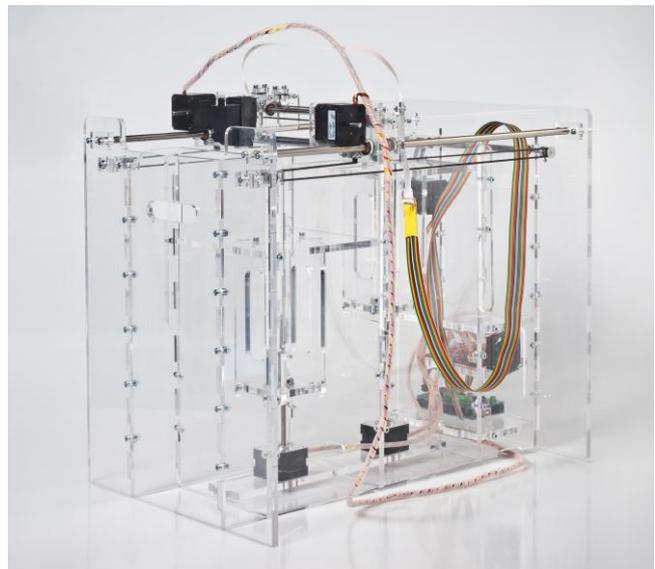
## *Assignment*

The goal of the project is to design and construct a machine that is capable of printing parts, by using a powder-based rapid prototyping technique. The design of the machine will be released under an open-source license to allow others to build, improve and alter the machine freely.

There is one additional requirement; the printer will be used to try creating ceramic membranes with specific properties. Hence it must be possible to alter the printer parameters, in order to reach the correct setup after some experiments, to successfully print the ceramic membranes.

## *Results*

Two aspects of powder-based rapid-prototyping were investigated prior the design process; the powder compaction and the liquid binder penetration. After these analyses, the requirements and wishes were composed for the machine. During this phase it was decided to initially start with the 3DP (three-dimensional printing) process, and to keep the SLS (selective laser sintering) process in mind during design. The designed printer has been build. Total building costs for the Model 0.1 are about €1000,-. The Model 0.1 has been successfully tested using Z Corps gypsum powder and promising for Alumina.



## *Personal experience*

During the master assignment, it's really satisfying to design and create something for real which turns out to be working right. This is something that's often lacking during the projects in the bachelors phase. But there are off course also some less satisfying aspects of a master assignment; for example, you're completely used to work in a team and thus have a quite large output. During a maser assignment, you've got to do and figure out by yourself, so everything takes a lot more time than assumed.