

## Polytech network form for PhD Research Grants from the China Scholarship Council

This document describes the PhD subject and supervisor proposed by the French Polytech network of 14 university engineering schools. Please contact the PhD supervisor by email or Skype for further information regarding your application.

<b>Supervisor information</b>	
<b>Family name</b>	FRAISSE
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<b>Lab name</b>	LIRMM
<b>Lab web site</b>	<a href="http://www.lirmm.fr">www.lirmm.fr</a>
<b>Polytech name</b>	Polytech' Montpellier
<b>University name</b>	Université de Montpellier
<b>Country</b>	France

<b>PhD information</b>	
<b>Title</b>	Robotic manipulation of soft objects – Towards a robotic Michelangelo
<b>Main topics regards to CSC list (3 topics at maximum)</b>	VI-7. Robot et intégration d'électromécanique Robot and integration of electromechanics

<b>Required skills in science and engineering</b>	Optimization, Robotics, Signal Processing
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## **Subject description (two pages maximum)**

Humans can intuitively use their hands to mould a piece of clay into objects. This is however a very difficult problem for a robot. This project aims to develop the ability of moulding by robots.

The main issues to be addressed are haptic/tactile perception, geometric and kinematic modeling of the interaction between the robot and deformable materials (here, plastics), and use of this model to develop relevant actions to enable various shapes.

The project will use techniques from robotics (including optimization and adaptive control) to enable this and will also explore the possibility of transferring human abilities of moulding onto a robot, exploiting recent advances in deep learning.