

PostDoc in **Robotic comanipulation of deforming objects**
Research Department: Laboratoire de Conception Fabrication
Commande, EA4495, Université de Lorraine.

Subject

The aim of the project is to design a control scheme for the comanipulation of deforming objects by using 2D vision and a collaborative robot (Yumi). The comanipulation of deforming objects in industrial applications is commonplace [1].

2D vision is also advantageous because it is light-weight, cheap and easily embeddable.

During this project, we will (i) track the 3D shape of the deformable object under robotic comanipulation and (ii) control its shape by determining end-effector motions despite occlusions.

- i. We will model the shape of the deforming object,
- ii. We will control the current shape of the object taking into account the current operator's task. The control scheme will take as inputs the current shape, the desired shape and the current operator's task.
- iii. We will experiment the perception and control schemes by using a collaborative robot Yumi.



Figure : Illustration of the robotic comanipulation of a deforming object by using the collaborative robot Yumi.

Context of the work

The Robotics and Control Team of LCFC lab includes researchers with a strong experience in robotics with industrial applications (ANR Hector).

The project is a continuation of the research work on the experimental dynamic identification of a YuMi collaborative robot during the Robotix Academy project [2].

The postdoc will communicate the results with the european partners of the project in Germany, Belgium and Luxembourg. The local team will provide the collaborative robot Yumi and mobilize an engineer in mechatronics as well as a workshop in electronics.

References

- [1] P. Jiménez, « Survey on model-based manipulation planning of deformable objects », *Robotics and Computer-Integrated Manufacturing*, vol. 28, n° 2, p. 154-163, avr. 2012, doi: 10.1016/j.rcim.2011.08.002.
- [2] M. Taghbalout, J. F. Antoine, et G. Abba, « Experimental dynamic identification of a YuMi collaborative robot », *IFAC-PapersOnLine*, vol. 52, n° 13, p. 1168-1173, 2019.

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Candidate Profile

The candidat must have a PhD in robotic.

To apply, send a CV, any publications and a motivation letter
to: Gabriel Abba, gabriel.abba@univ-lorraine.fr

Limit date for the application: 2021, August 15

Salary: around 24 k€ gross annual for 10 months

Startdate: 2021, September 1st