

RESEARCH TOPIC FOR THE PARISTECH/CSC PHD PROGRAM (one page maximum)

Field: Design, Industrialization

Subfield: Numerical optimization algorithms

Title: Design optimization using manufacturing processes

ParisTech School: Arts et Métiers Sciences et Technologies

Advisor(s) Name: K BENFRIHA/A AOUSSAT

Advisor(s) Email: Khaled.benfriha@ensam.eu

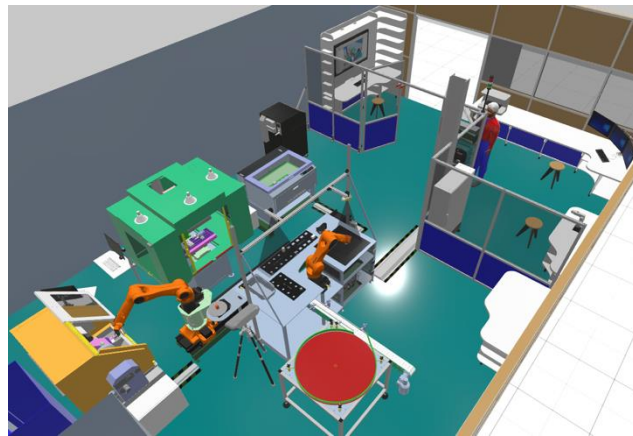
Research group/Lab: LCPI

Lab location: Paris

(Lab/Advisor website):

Short description of possible research topics for a PhD: (10-15 lines in English + optional figure)

We have designed and built a new intelligent and connected robotic production workshop. Several international phd students are already working on topics such as flexibility of operations, predictive maintenance, the digital twin and network architecture (distributed system).



We invite you to join this team of researchers and contribute to advance industrialization performance. as you can see in the opposite illustration, the workshop is made up of kuka robots and several numerically controlled machine tools, as for the IoT layer is made up of different sensors and smart cameras. In addition, the controlling of the various operations is carried out by wonderware numerical platform.

the subject that we propose is how the data generated by the manufacturing processes can be used to optimize the design of the product?

This thesis offer can be carried out jointly with a partner university (cotutelle)

Required background of the student: (What should be the main field of study of the applicant before applying?)

design process, smart industry, industrial computer science, optimization methods

A list of 5 (max.) representative publications of the group: (Related to the research topic)

1. Adjoul O., Benfriha K., Aoussat A. 2018. Algorithmic strategy for optimizing product design considering the production costs. IJIDeM.
<https://doi.org/10.1007/s12008-019-00571-w>
2. Laudante E. 2017. Industry 4.0, Innovation and Design. A new approach for ergonomic analysis in manufacturing system. The design journal.
<https://doi.org/10.1080/14606925.2017.1352784>
3. Przemysław Zawadzki, Krzysztof Żywicki, 2016. Smart product design and production control for effective mass customization in the industry 4.0 concept.
<https://doi.org/10.1515/mper-2016-0030>
4. Bortolini M., Ferrari E., Gamberi M., Pilati F., Faccio M., 2017. Assembly system design in the Industry 4.0 era: a general framework. IFAC-PapersOnLine.
<https://doi.org/10.1016/j.ifacol.2017.08.1121>
5. Hock Ang J., Goh C., Li Y., 2016. Smart design for ships in a smart product through-life and industry 4.0 environment. IEEE Congress on Evolutionary Computation (CEC). <https://doi.org/10.1109/CEC.2016.7748364>