

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

**Field:** Design, Industrialization

**Subfield:** Industry 4.0/Smart factory

**Title:** Cloud manufacturing

**ParisTech School:** Arts et Métiers Sciences et Technologies

**Advisor(s) Name:** K BENFRIHA/A AOUSSAT

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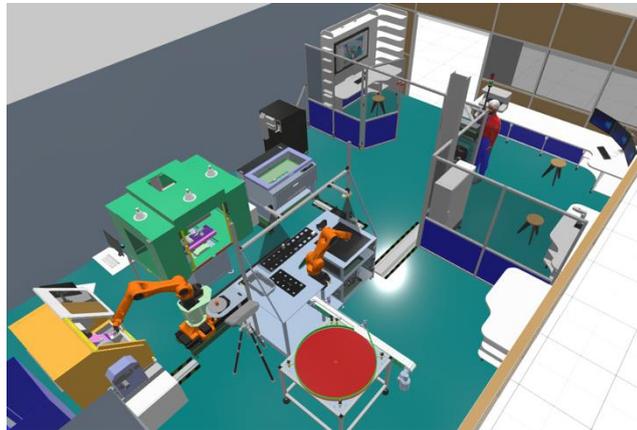
**Research group/Lab:** LCPI

**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 we propose concerns the use of the generated data in order to optimize the production in real time. 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?)

industrial process, smart industry, industrial computer science.

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

1. Block, C., Lins, D., Kuhlenkötter, B., 2018. Approach for a simulation-based and event-driven production planning and control in decentralized manufacturing execution systems. *Procedia CIRP* 72, 1351–1356.  
<https://doi.org/10.1016/j.procir.2018.03.204>
2. Borangiu, T., Trentesaux, D., Thomas, A., Leitão, P., Barata, J., 2019. Digital transformation of manufacturing through cloud services and resource virtualization. *Computers in Industry* 108, 150–162.  
<https://doi.org/10.1016/j.compind.2019.01.006>
3. Erol, S., Schumacher, A., 2016. Strategic guidance towards Industry 4.0 – a three stage process model 8.
4. Ghobakhloo, M., 2018. The future of manufacturing industry: a strategic roadmap toward Industry 4.0. *Jnl of Manu Tech Mngmnt* 29, 910–936.  
<https://doi.org/10.1108/JMTM-02-2018-0057>
5. Rojko, A., 2017. Industry 4.0 Concept: Background and Overview. *Int. J. Interact. Mob. Technol.* 11, 77. <https://doi.org/10.3991/ijim.v11i5.7072>