FOR APPLICATION, PLEASE CONTACT ADVISOR(S) BY EMAIL WITH COPY TO:
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Research Topic for the ParisTech/CSC PhD Program

Subfield: Industrial Engineering

ParisTech School: Metz campus

Title: Design and development of a process family planning prototype system

Advisor(s): Prof. Ali SIADAT, Centre Arts et Métiers ParisTech de Metz, France
Prof. Linda ZHANG, IESEG School of Management (LEM-CNRS), France,
(https://www.ieseg.fr/en/faculty-and-research/professor/?id=1776)

Short description of possible research topics for a PhD:
This project is aimed at designing and developing a prototype system to plan production processes for product families (i.e., process family planning).

In the recent past, manufacturing firms worldwide have been pursuing mass customization in delivering families of customized products at affordable costs. Process family planning is put forward to help firms effectively produce product families while reusing proven manufacturing knowledge and available facilities. It entails the planning of production processes for product variants based on a process platform of the product family. In accordance with the product complexities, production processes are complex and difficult to plan manually. In this regard, it is necessary to design and develop computer systems to support process family planning automation. There are several important issues to be addressed in designing and developing a process family planning system, including the modeling of process family planning from both the static and dynamic perspectives, the design of system components and their interactions, and the development of a prototype.

Required background of the student: Industrial Engineering, Computer Information Systems, Computer Programming

A list of 5 (max.) representative publications of the group:

1. **Zhang, L.** and Jiao, J., A graph rewriting system for process platform planning, *Decision Support Systems*, 2013, 54(2), 1174-1191.
2. **Zhang, L.,** Xu, Q., and Helo, P., A knowledge-based system for process family planning, *Journal of Manufacturing Technology Management*, 2013, 24(2), 174-196.
3. **Zhang, L.,** Xu, Q., and Helo, P., A methodology integrating Petri nets and knowledge-based systems to support process family planning, *International Journal of Production Research*, 2012, 50(12), 3192-3210.
4. *K. U. ZAMAN, A. SIADAT, M. RIVETTE, A. BAQAI, L. QIAO, « Integrated product-process design to suggest appropriate manufacturing technology: a review", International Journal of Advanced Manufacturing Technology, 2017.*
5. *Q. XIA, A. ETIENNE, J.-Y. DANTAN, A. SIADAT, « Reconfigurable machining process planning for part variety in new manufacturing paradigms: Definitions, models and framework", Computers and Industrial Engineering, 2018*