



SUBJECT OF THESIS 2021 2022

Thesis title :

Setting up a methodology and a digital twin to deal with eco-design in R&D and the problem of scaling issues.

Thesis director (s) :

Peggy ZWOLINSKI (Director) GRENOBLE-INP, G-SCOP - Laboratoire des Sciences pour la Conception, l'Optimisation et la Production de Grenoble - 46, avenue Félix Viallet - 38031 Grenoble Cedex 1

Olivier GIRARD (Co encadrant), CEADRT/DPFT//LSIT, 17 rue des Martyrs, 38054 Grenoble Cedex

Doctoral school: MEP2: Ingénierie - Matériaux - Environnement - Energétique - Procédés – Production

Beginning of thesis: 01/10/2021

Funding envisaged - Context - Possible partners :

Funded by CEA, the thesis will be mainly based at CEA, Département des Plateformes Technologiques (LETI), Service Méthodes, Interface Technologique et Logistique / Labo Support et Interface, TechnoCentre : Grenoble

Brief Description:

The environmental analysis, carried out in industry, consists in anticipating for each phase of the life cycle of the future product the environmental impacts which will be generated. It appears that the teams in charge of developing new technologies or new processes often tend to avoid this global environmental analysis logic. However, certain choices made in the early stages of development have a strong influence on future global impacts. The aim here is to identify an approach to make the processes involved in the development of nano-components more eco-efficient, as these processes can have a significant impact on the environment. It will be necessary to identify, from the prototyping phases, the impacts of the manufacture of the new technologies envisaged and to anticipate the potential impacts of future production lines, in order to be able to deploy eco-design actions. Several actions need to be carried out to assess the environmental impacts of these emerging technologies/processes i) structuring and capitalising on knowledge and skills to carry out and interpret environmental impacts; ii) collecting inventory data i.e. energy and material flows used in production units that are not yet mature; iii) developing knowledge on impact transfers; iv) creating tools to take into account environmental constraints when scaling up. In other words, from a LCA of the pilot line we will by extrapolation build a methodology and a tool to simulate the effects of scale-up in production.

Contact(s) :

Olivier GIRARD – olivier.girard@cea.fr

Peggy ZWOLINSKI – Peggy.Zwolinski@grenoble-inp.fr