

Research Topic for the Arts et Métiers ParisTech - CSC PhD Program

Subfield: *Materials Science & Engineering / Mechanical Engineering*

ParisTech School: *LaBoMaP, Arts et Metiers ParisTech, Campus of Cluny*

Title: Tool Materials Development for Improved Performance of Cutting Tools in Cryogenic Machining of Aeronautic Alloys

Advisor(s): *Corinne Nouveau, corinne.nouveau@ENSAM.EU*

Short description of possible research topics for a PhD:

Environmental concerns and cost reduction of metal working fluids (MWF) used in machining operations result in ever-growing industrial interest in replacing these fluids with eco-friendly cryogenic fluids such as liquid nitrogen (LN2). However, research on machining under cryogenic conditions (also referred to as cryogenic machining) using existing cutting tools (developed for use with common MWF) have shown a large scatter in tool wear, and thus tool life. This scatter can be partially attributed to the subpar performance of the existing cutting tools under cryogenic temperatures.

The proposed project aims developing of the next generation of cutting tools for cryogenic machining (milling, turning and milling). The objective is to enhance the performance of the cutting tools for cryogenic machining by improving the chemical/mechanical/physical properties of the tool materials.

A COMPLETER

Required background of the student:

- A master's degree in mechanical engineering or materials science.
- Ability to work independently, to plan and carry out tasks, and to be a part of a large, dynamical group.
- Good communication skills in English or French, both written and spoken.
- Experience with numerical simulations and programming skills is an advantage but not an exclusion criterion.

2-3 representative publications of the group:

FOR APPLICATION, PLEASE CONTACT ADVISOR(S) BY EMAIL WITH COPY TO:

ali.siadat@ensam.eu AND yvon.velot@ensam.eu