

INTERNSHIP OFFER 2017 : CONSTELLIUM TECHNOLOGY CENTER

Training title	Analysis of grain interactions from EBSD orientation maps and crystal plasticity modeling		
Tutor name	J. Chevy +N. Bayona Carrillo/P. Jessner		
Tutor address	Tel. : 04 76 57 81 23 mail : juliette.chevy@constellium.com		
Activity	Technology & Innovation – C-TEC	Accommodation help	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Location			
Voreppe, Isère (20 km from Grenoble) + Some time will have to be spent in Metz (LEM3 laboratory)			
Purpose			
<i>Characterize and model grain interactions and their influence on deformation heterogeneities and strain localization.</i>			
Training challenges			
<p>Context: Constellium continuously develops higher performance aluminium alloys for aerospace and automotive applications. Increasing performance requires a very good control of the link between properties, microstructure and processing parameters. Texture (grain orientations) is a key microstructural parameter that influences mechanical behaviour either directly (plastic deformation of each grain and incompatibilities between grains) or indirectly (eg: heterogeneities in precipitation). A relevant characterization of the texture is complex and advanced methods using misorientation correlation functions or analysis of the neighbouring grains can be used to figure out the link between microstructure and deformation heterogeneities and strain localization.</p> <p>Environment: Most of the work will be carried out at C-TEC, Constellium Technology Center in Voreppe (close to Grenoble) under the supervision of metallurgists and EBSD specialist. Some training on a specific EBSD postprocessing tool (supervision B. Beausir) and on the numerical model (supervision V. Taupin) will have to be performed out at LEM3 laboratory in Metz at the beginning of the internship (estimated to 2 to 3 weeks).</p>			
Results Expected			
<ul style="list-style-type: none"> • After having been trained to texture analysis tools (JTEX and ATOM) in Metz, advanced texture analysis will be carried out at C-TEC. Several case studies will be considered <ul style="list-style-type: none"> - Comparison of new and conventional Al-Cu-Li alloys for aerospace application. Samples in the initial non-deformed state and after different levels of deformation in tension will be considered. - 6xxx alloys for automotive application: influence of texture on strain localization during bending and on appearance of surface defects (roping). • A Finite element modelling taking into account specific conditions at grain boundaries will be used to model the influence of grain morphology, orientation and neighborhood on strain localization. 			
Profile			
<u>Education / Knowledge / Skills</u>			
Master's degree in material science or mechanical engineering. Previous experience in FE modelling will help.			
<u>Behavior capacities</u>			
Ability to work in both academic and industrial environment.			
<u>Other</u> (language, computer science level...)			
The internship report will have to be written in English. Some French is suitable.			
<ul style="list-style-type: none"> ▪ Dates of internship preferred : First semester 2017. 			
Comments			