

Title	France/Australia co-tutelle PhD: Understanding the link between microstructure and wear of complex steels
Abstract	<p>In the case of mining device, the wear problem is a critical one. Indeed, the wear is the natural outcome of the digging process and it is limiting the life time of materials. The usual materials used in this case are complex steels. They can be constituted of one or several phases which can have different mechanical properties. During their use, they are subjected to very large deformation. Thus the understanding of the interaction between the different constituting phases and the wear is of prime importance. However, the problem induces different physical mechanisms acting at the same time such as strain hardening, large deformation, wear. The goal of this PhD will be to get a better understanding of this phenomenon.</p> <p>During this PhD, the real microstructure coming from digging device will be characterised. Then some high deformation tests will be carried out to try to reproduce the same microstructure on large samples. For doing so, torsion and/or Gleeble machine can be used. Even if the strain path will be different, the testing parameters (strain, strain rate) will be varied to be able to obtain an equivalent microstructure on large sample. The microstructure characterization will involve different techniques from SEM to TEM, or X ray diffraction. Then the mechanical properties will be evaluated. Physically based modelling will be used to uncouple the different phenomena taking place. Then, some variation of the initial microstructure can be tried to reduce the wear behaviour.</p>
Context	This research is funded by Deakin University and co-supervised with INSA Lyon. This project will result in double PhD degree with the two institutions. The core of the student's project will be spent at the Institute for Frontier Materials (Deakin University). The student will also spend at least 1 year at MATEIS (INSA).
Value and duration	
Eligibility	<p>To be eligible for this scholarship you must:</p> <ul style="list-style-type: none"> • have a first class honours or 2a honours or equivalent in materials, manufacturing or mechanical engineering, physics or chemistry • provide evidence of good oral and written communication skills • Demonstrate ability to work as part of a multi-disciplinary research team. • meet Deakin University's entry requirements for the higher degree by research
Open date	Applications now open.
Close date	Applications will close when a candidate is selected.
Terms and conditions	Read the Deakin University Research Scholarship Terms and Conditions.
Further info	Project anticipated to be conducted in conjunction with the MATEIS laboratory (INSA Lyon) double degree will be between Deakin University and INSA Lyon.
Contact	For further information contact Prof Damien Fabregue (INSA) : damien.fabregue@insa-lyon.fr

