Internship proposal Master 2

Contact:

UMR PAM

Thomas KARBOWIAK

thomas.karbowiak@u-bourgogne.fr

Subject: Image analysis applied to the transfer of oxygen in stoppers for the preservation of wines

One of the top priority issues in enology for the quality of wines concerns the control of the aging of wines and the understanding of the origin of organoleptic defects, in particular the so-called premature oxidation. One of the key factors is related to the barrier properties of the stopper.

Thanks to its remarkable intrinsic properties (elasticity, low permeability to gases and liquids, imputrescibility, ...), cork used as a stopper still accounts for more than 60% of the market, ie more than 10 billion (annual) of corks in the world. On the French market, 80% of corks are made of cork, accounting for about 2.4 billion stoppers. In view of its still very predominant use in oenology, it is essential to better characterize this natural material.

First, the knowledge of the internal structure of the material is crucial information to better understand the phenomena of mass transfer through cork, particularly oxygen. Non-destructive imaging tools such as neutron or X-ray tomography can be used to characterize this internal structure of cork in 3D.

The objective of this work will be to develop an approach based on the processing of acquired images to reconstruct the 3D structure of the material and to use it in order to integrate by means of modeling tools other data obtained on the transfer of oxygen. This approach can then be applied to agglomerated stoppers, taking into account the phenomena of diffusion in a multi-material object. A dimensioning by a modeling approach could thus open up perspectives to address questions of practical interest on the optimal dimensions of stoppers as well as on the optimization of the formulation parameters for agglomerated stoppers.

Paid internship: ~550 Euros / month

Date: 6 months; beginning: January to April 2018 – end: July to September 2018

Place: Dijon, University of Burgundy, AgroSup Dijon, UMR PAM

Application deadline: 31st December 2017 (by mail).