**UMR INRA 547 PIAF Physique et Physiologie Intégratives de l’Arbre en Environnement Fluctuant, Clermont Université (Bruno Moulia)**

**Thesis supervisor :** Philippe MALAGOLI (Associate Professor, Université Clermont Auvergne), **Co-supervisor :** Marc Saudreau (Research fellow, INRAE)

Philippe.MALAGOLI@uca.fr, marc.saudreau@inrae.fr

***Impacts of radiation and temperature heterogeneity within the leaf crown on foliar nitrogen allocation***

Reducing the use of both nutritional and pesticide inputs in tree systems is based on rethought technical interventions. Although nitrogen dynamics have been characterized in trees, little work has been done on the determinism of the distribution of this element during the annual development cycle. The objective of the thesis will be to establish the determinism of N allocation (from uptake and remobilization of reserves) within the leaf crown in apple trees in relation to the distribution of radiation and temperature. In addition, the response of nitrogen distribution to a temperature increase will also be explored. Nitrogen fluxes will be quantified using 15N, while the characterization of the micro-climate (radiation and temperature) at the organ level as well as that of growth and functioning will benefit from local expertise in physical and ecophysiological measurements. The laws of action resulting from these experiments will feed the RATP model developed at PIAF.