



Carlos Henrique Britto de Assis Prado est professeur à l'université fédérale de Sao Carlos à Sao Paulo, Brésil. Il est chercheur en écophysiologie des plantes, spécialisé dans les aspects hydrauliques et la photosynthèse. Depuis quelques années il s'intéresse à la structure des plantes dans les formations végétales de type Cerrado et Caatinga, son approche de l'architecture se fait au travers des graphes. Il effectue un séjour de deux mois au laboratoire en attendant de bénéficier d'un financement pour un séjour long dans les années à venir.

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Salle 201, Bâtiment PS2, CIRAD-UMR AMAP,  
Boulevard de la Lironde

## **A network model to obtain decomposition, topology, and properties of woody crown**

*presented by*

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### **ABSTRACT**

Woody species acquire space primarily by branching and increasing the length of ramifications. The coordination of branching in the woody crown is essential to determine where in airspace the acquired resources will be used. A model enabling us to see how branching occurs may uncover the plant strategy to obtain, use, and store its supplies. We proposed in 2011 a model to understand the inevitable outcome after branching, a network composed of nodes and connectors. Identifying the types of nodes by their position, number of connectors, and biological significance, it was possible to measure some decomposition and topological features of the woody crown network (WCN). The number of every type of node, the total amount of nodes and connectors, and the proportions of them performed the decomposition of WCN. The distances between different kinds of nodes counted in some connectors captured the WCN topological features. By decomposition and topological traits, it was possible to identify functional groups of tree species of Cerrado vegetation. We expanded our model, combining decomposition and topology to obtain the properties' navigability, vulnerability, symmetry, and complexity. Using Cerrado and Caatinga vegetations in Brazil, we could test the meaning of each property in a wide range of WCN sizes. Here in Montpellier, we are testing the behavior of the properties in six botanical models well established, searching one integrated model able to identify functional groups of woody species regardless of their taxonomic proximity.

**Invited and animated by:**

Yves CARAGLIO

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Questionnement scientifique

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