Proposed Research Studentship

Title: Cretaceous angiosperms: seeing the trees from the wood

Supervisors: Dr. Howard Falcon-Lang

Project Description:

Angiosperms (flowering plants) are the most abundant and diverse group of land plants on Earth. Almost 130 years after Charles Darwin described their origin as an "abominable mystery", the early evolutionary history of these plants remains enigmatic. Recent research has centred around two hypotheses. Proponents of the "Wet and Wild" hypothesis argue that the earliest angiosperms were non-woody aquatic plants like present day water lilies. Those who contest that evolutionary origins were "Dark and Disturbed" consider small woody shrubs like *Amborella* as the progenitor of all flowering plants.

In this project, the student will analyse the wood of fossil and living angiosperms to investigate the origins of this group and shed light on one of biology's great mysteries. In earlier studies of angiosperm evolution, the importance of wood has been largely overlooked. In part this neglect is due to the fact that fossil angiosperm wood is absent during the first 40 million years of angiosperm evolution. However, this state of affairs probably reflects our incomplete knowledge of the fossil record rather than a genuine lack of woody angiosperms. Another problem is the difficulty identifying angiosperm woods with sufficient precision for phylogenetic studies.

The student will overcome these problems by quantitatively analyzing the wood of all primitive living angiosperms based on collections at the Royal Botanic Gardens, Kew. In doing so they will refine the 'search image' for early angiosperm fossil wood specimens and improve the systematic placement of fossil woods. They will also re-examine fossil collections to identify candidates for the earliest angiosperm woods. This work will shed new light on the evolution and early ecology of angiosperms and go some way to solving Darwin's enigma.

Training and Outcomes
The student will be encouraged to publish results in high-impact journals such as *Geology* and disseminate findings through international media. The project will include full training in wood anatomy, morphometrics, statistics, palaeobotany, relational database construction, and science communication.

Further reading
OAKLEY, D., **FALCON-LANG, H.J.** & GASSON, P. 2009. Morphometric analysis of some Cretaceous angiosperm woods and modern structural and phylogenetic analogues: implications for systematics. Review of Paleobotany and Palynology 157: 375–390.
OAKLEY, D. & **FALCON-LANG, H.J.** 2009. Morphometric analysis of Cretaceous (Cenomanian) angiosperm woods from the Czech Republic. Review of Palaeobotany and Palynology 153: 375-385

*Further information can be found on the Department's Web site (**http://www.rhul.ac.uk/earthsciences**).*
*Please contact the Postgraduate Programmes Co-ordinator, if you have additional questions about the department or application procedures (email: **pgadmin@es.rhul.ac.uk** ; fax: 01784-471780; tel: 01784-443581).*
*An application form can be found here **http://www.rhul.ac.uk/studyhere/postgraduate/applying***
Applicants are requested to send an additional copy of their CV directly to the lead supervisor of the project in which they are interested. Please also contact the supervisor if you have any questions about the project itself.