

# Understanding the influence of wood species on resin modification and property enhancement in resin-modified wood-PhD studentship

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***Understanding the influence of wood species on resin modification and property enhancement in resin-modified wood***

***PhD studentship***

The BioComposites Centre, Bangor University

**Project ID:** BUK2E028

**Annual Stipend:** £14,483

**Application Deadline:** 3rd January 2020

This project will investigate chemical and physical parameters affecting the treatment of timber with a resin system to enhance performance and durability.

Wood modification is an emerging field, offering an alternative to chemical preservative treatments, and creating a new generation of timber products for advanced applications. Lignia Wood Company have developed a process to create timbers that behave like hardwoods, using a fast-growing, renewable sustainable softwood.

This project will investigate options for expanding the range of timbers used in this process, understanding chemical effects of the wood on curing reactions, effect of resin characteristics on impregnation and reactivity, and investigate the effect of temperature and other parameters on processing rate. It would suit a candidate with a keen interest in chemistry, materials science or physics. A degree in chemistry or wood science is preferred, but any relevant science degree will be considered, and training to cover knowledge gaps can be made available.

PhD supervisors in Bangor University (Dr Morwenna Spear, Dr Graham Ormondroyd) and at Lignia (Dr Andrew Pitman) are all experienced in supervising PhD candidates in the field of wood science and bio-based materials. Prospective candidates are encouraged to contact Dr Spear ([m.j.spear@bangor.ac.uk](mailto:m.j.spear@bangor.ac.uk)) or Dr Ormondroyd ([g.ormondroyd@bangor.ac.uk](mailto:g.ormondroyd@bangor.ac.uk)) to discuss the project.

The expected start date is January 2020, or sooner.

### Project outline

It is expected that three main phases of work are required for this project. The first considers the chemical characteristics of the wood – buffer capacity, extractives, as well as the physical (microscopic) aspects such as cell structure, flow pathways. A selection of timbers will be considered, including Welsh grown species, to assess potential for use with the existing resin systems. The second phase of the project will address changes in resin chemistry and properties (including molecular weight, pH, catalysis, stability, water tolerance, viscosity) which may enhance performance when used in treating the selected new timber species. Physical and chemical methods will be used to evaluate resin cure, and the effect of timber on cure rate in the conditions used in the industrial process. Effects of cure rate and reaction condition on other properties will be studied, these include location within the wood cell wall, mechanical properties of the cured resin, e.g. toughness or brittleness, resulting properties of the treated wood. Phase three of the project will involve working with Lignia to produce larger samples of timber suitable for full range of mechanical and physical properties determination.

To apply please send a CV and covering letter to Dr Spear ([m.j.spear@bangor.ac.uk](mailto:m.j.spear@bangor.ac.uk)) and cc to Penny Dowdney ([p.j.dowdney@bangor.ac.uk](mailto:p.j.dowdney@bangor.ac.uk)).

Knowledge Economy Skills Scholarships (KESS 2) is a pan-Wales higher level skills initiative led by Bangor University on behalf of the HE sector in Wales. It is part funded by the Welsh Government's European Social Fund (ESF) convergence programme for East Wales.

Due to ESF funding, eligibility restrictions apply to this scholarship. To be eligible, the successful candidate will need to be resident in East Wales on University registration, and must have the right to work in the region on qualification.

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