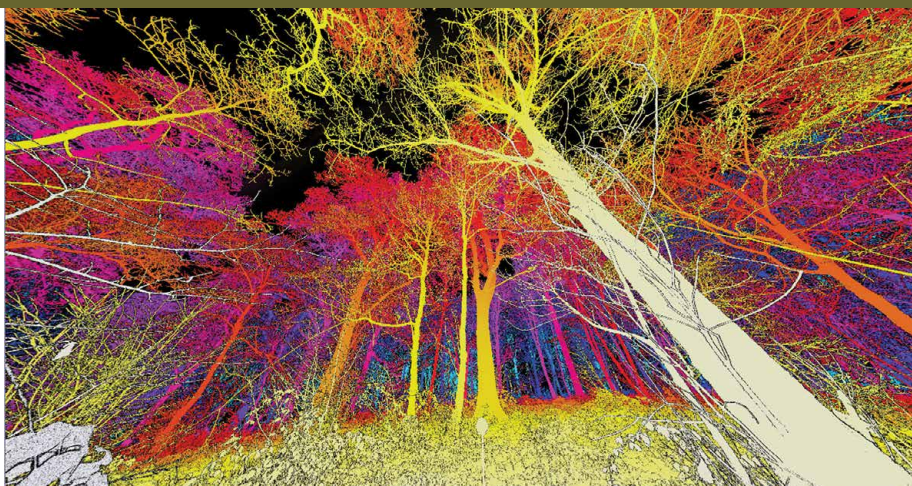


# Bud burst

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NEWSLETTER OF THE BIRMINGHAM INSTITUTE OF FOREST RESEARCH



## Solid Air

Professor Rob MacKenzie, BIFoR Director



I doubt that John Martyn was thinking of the conversion of carbon dioxide and water to wood when he wrote his 1970s classic — his lyrics focus on the difficulty of moving forward through life as though through solid air — but, as metaphors go, ‘solid air’ could hardly be better suited to the process we want to study in the BIFoR Free-Air Carbon Dioxide Enrichment (FACE) experiment at Mill Haft woodland in Staffordshire.

With planning permission secured, we are moving purposefully forward to put our ideas for BIFoR FACE into solid form. We have begun the preparatory works to re-model the west entrance to Mill Haft, which will be the ‘front door’ to the facility. As will be the case throughout the build, we are losing no opportunity to capitalise scientifically. Using laser technology, Dr Eric Casella of Forest

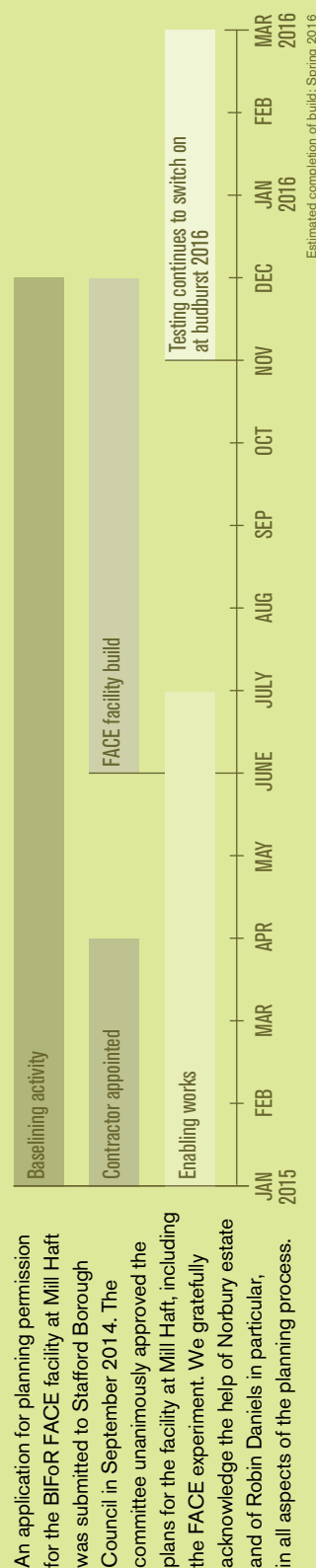
Research, has captured the 3-dimensional structure of the woodland, including the few trees that have had to be felled to make way for the entrance (see photo above).

After felling, we have weighed and measured specimen trees (totalling about 5 tonnes of wood in each tree), in order to understand how the mass is distributed between trunk, main branches, and twigs. We have also carefully cut and stored stem cross-sections from each tree in order to use dendrochronology and isotope analysis to establish the environmental history of Mill Haft, guided by our first Distinguished Visiting Fellow, Dr Debbie Hemming of the Met Office.

As well as informing our understanding of the long-term carbon dynamics within the BIFoR FACE experiment, colleagues in forestry such as Mike Bentley, until recently of the Small Woods Association, have explained to us how such opportunistic science can deliver immediately useful results back to practitioners: rules-of-thumb regarding the ratio of sawn log to firewood in hardwood forests, allowing woodland owners and managers to improve their business models.

And that, in a little acorn of an example, is what BIFoR is about: closing the loop between science and practice in forest research in the UK and throughout the world.

### BIFoR FACE Facility Timeline



An application for planning permission for the BIFoR FACE facility at Mill Haft was submitted to Stafford Borough Council in September 2014. The committee unanimously approved the plans for the facility at Mill Haft, including the FACE experiment. We gratefully acknowledge the help of Norbury estate and of Robin Daniels in particular, in all aspects of the planning process.





### Just out of reach

January, BIFoR researchers undertook a tree climbing course, run by **Canopy Access Ltd.** As well as building a strong team spirit, and a healthy respect for working in and around trees, the course enables the trained researchers to collect samples and take measurements at the very top of the trees in the BIFoR FACE experiment, where light and elevated CO<sub>2</sub> interact most strongly to produce changes in leaf photosynthesis.

## BIFoR's wood wide web

Throughout autumn/winter we have taken every opportunity to discuss BIFoR with colleagues and mentors throughout the sector. A few of the stand-out moments are listed below:

- **Crown Estates** – a wonderful evocation of the value of ancient wood-pasture and a cogent demonstration of the Estate's commitment to the sustainability 'triple bottom line' of social, environmental and economic value.
- **Wytham Woods** – fascinating insights into making a research forest work long-term.

- **New Phytologist** workshop on model-data synthesis of FACE experiments, **Max-Planck Institute, Jena** – the subtleties, and sometimes plain common sense, needed in abundance to match models and observations.
- **Cornerways Nursery** – the clever 'industrial ecology' of growing tomatoes using carbon dioxide from power generation.
- **Small Woods Association** – untangling the many physical and psychological effects that make a walk in the woods so nourishing to our health and well-being.

### Upcoming key events

- 14–15 April – We will exhibit and Birmingham speakers will present their research at **UK PlantSci Conference**.
- 18 June – Immediately after **Barcham Trees' Big Barn Conference** we will be delighted to host at BIFoR **Dr David Nowak**, of the USDA Forest Service.
- 20–23 July, **Royal Welsh Show** – We will exhibit alongside the **ICF's** higher education initiative.

### Visiting Fellow:

#### Dr Deborah Hemming

Scientific Manager, Vegetation–Climate Interactions group at Met Office

I'm very excited to be joining the BIFoR team for 5 months. BIFoR provides a unique and inspiring opportunity for scientists from a wide range of disciplines to join forces and improve



our understanding of the resilience of UK woodlands to climate and environmental changes. My research at the Institute is focussed on understanding and modelling the processes that regulate spring in our native oak trees. We know from a wealth of historic observations from tree species across the UK that spring bud burst and leaf out has been getting earlier, partly in response to warming temperatures. But we don't know whether trees will continue to shift their seasonal growth in response to climate changes, and how future projected increases in carbon dioxide in the atmosphere will affect these responses. This is not only important to help us manage our trees and woodlands in the future, but also because trees currently absorb about a third of the amount of carbon dioxide that humans emit globally. If this carbon uptake is reduced in the future then carbon dioxide concentrations in the atmosphere would rise more rapidly, making it more difficult for governments and societies to deal with the impacts of rising greenhouse gas levels on climate change.

### What shape is an urban tree?

The first joint programme of research between BIFoR and **Forest Research** will be on urban tree allometry, using trees on the University of Birmingham campus that will be lost during building work. Allometry is the name for the statistical relationships that relate one measure of the shape, size, or mass of a tree, to another. Given how much we take urban trees for granted, we should not be surprised to learn that little is known about the size and shape of trees in urban settings. The programme was agreed in December 2014 between BIFoR and the Head of Urban Forestry at Forest Research, Dr Kieron Doick. The University's policy is to replace any trees sacrificed during building work and to increase total tree stock over time.



### Stay in touch

Email: [bifor@contacts.bham.ac.uk](mailto:bifor@contacts.bham.ac.uk)  
 Twitter: @BIFoRUoB  
 Phone: 0121 4146146  
 Website: [www.birmingham.ac.uk/bifor](http://www.birmingham.ac.uk/bifor)

### BIFoR Interdisciplinary Leadership Fellows

The following University of Birmingham staff have stepped up to show the way in different aspects of the BIFoR research agenda. Access details of their research interests through the online version of this newsletter.

- Dr Holly Bik** (biodiversity)
- Dr Laura Griffith** (superdiversity)
- Dr Louise Hardwick** (ecocriticism)
- Dr Stefan Krause** (water)
- Dr Francis Pope** (atmosphere)
- Dr Frank Uekötter** (history)

If you would like to meet any of the BIFoR team, please get in touch via [bifor@contacts.bham.ac.uk](mailto:bifor@contacts.bham.ac.uk).