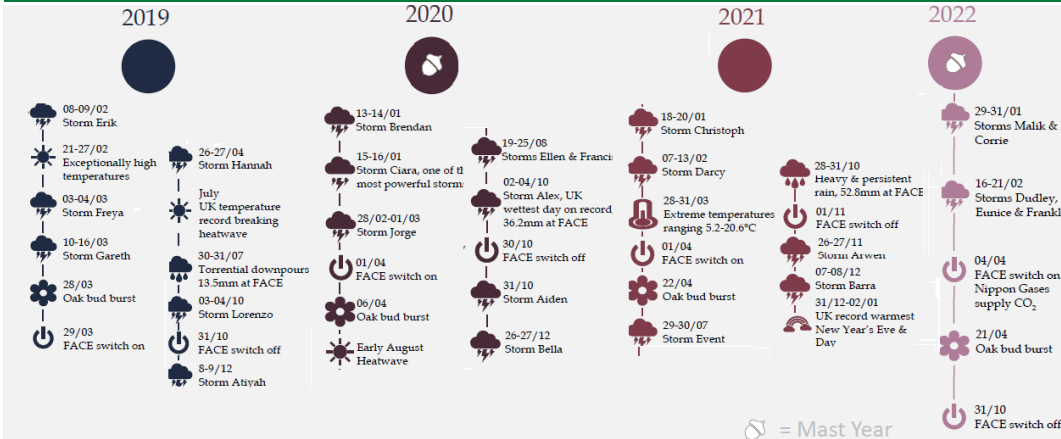


# Bud Burst



BIFoR FACE Facility timeline of key events and weather, this graphic is adapted from a timeline going back to 2014 which available on our website, with thanks to Dr **Angeliki Kourmouli**

## Funding success

Prof **Vincent Gauci** has won £1million from NERC to continue important research into atmospheric methane (CH<sub>4</sub>), a green house gas that currently contributes 0.5°C of global anthropogenically enhanced warming. There is a clear need to understand all the sources and sinks of atmospheric methane, as there is uncertainty around how they will change with changing forest cover, principally through deforestation.

**RenEco** are funding a new scholarship programme, beginning September 2025 that will enable six **RenEco BIFoR PhD scholarships** focusing on carbon and nutrient cycling, clean energy, decarbonization, bioremediation, clean air-water-soil and carbon capture. This donation comes further to a new partnership with **Wykes Engineering Ltd** (see over).

## CO<sub>2</sub>: trees' ally or enemy? asks **Dr Alice Gauthey**

At BIFoR we have seen some extreme events, the winter moth infestation of 2018 and over twenty named Storms that bring through their own short bursts of destruction. Back in 2022, the UK experienced an unprecedented heatwave event, with air temperatures reaching above 40°C in the UK for the first time in recorded history. These extreme air temperatures came along with soil drought and even led to local wildfires. These climatic events fit with a wider pattern globally where heat waves are moving from "rare" events to something we see every summer. So how can we use our experimental forest to better understand how these events might impact our mature trees of the future? Our newest research fellow, Dr **Alice Gauthey**, has some ideas. Alice is particularly interested in heat and droughts, known as "hot droughts", that can be so severe as to cause tree death. In these scenarios, tree death is driven by the plants' inability to maintain their water balance. This occurs because plants need to open stomata to let CO<sub>2</sub> in from the atmosphere to drive photosynthesis.

However, as CO<sub>2</sub> flows in, water flows out (a process called evapotranspiration). Evapotranspiration is important for plants because it cools the leaf surface, like to how we cool our skin through sweat. However, on extremely hot days it can also drive considerable water loss and create bubbles of air inside the water-filled vessels (embolism). Thus, during hot drought events, plants will try to keep water inside their tissue by closing the stomata. However, this not only stops photosynthesis, which in a long run can lead to carbon starvation, but it also restricts evapotranspiration, which drives leaf temperatures above mortality thresholds. With higher concentrations of CO<sub>2</sub> in the atmosphere, driven by anthropogenic activities, plants gain a slight advantage, as they are able to open their stomata less in exchange for the same amount of CO<sub>2</sub>. So, could elevated CO<sub>2</sub> mitigate the negative effects of hot droughts on plants photosynthesis and growth? Using both our BIFoR FACE experiment and the Wolfson Advanced glasshouses, **Alice** aims to dig into this plant trade-off over the next three years.



Please join us on 19 and 20 June 2024

Registration is open  
[www.birmingham.ac.uk/biforcom24](http://www.birmingham.ac.uk/biforcom24)



Above: BIFoR team at the Women in STEM event at the Thinktank, Birmingham. The stand was very popular with passersby and 5 of the rapidly expanding '[BIFoR Outreach and Education](#)' team gave inspiring lectures.

## BIFoR FACE: new partnership, new funding, new era

The BIFoR Free Air CO<sub>2</sub> Enrichment (FACE) facility welcomes all researchers seeking to investigate the ecological, physiological, pathological, and biogeochemical responses of a woodland under elevated CO<sub>2</sub>. Originally scheduled to cease the CO<sub>2</sub> treatment in November 2026, very substantial philanthropic and University support has now assured the continuation of the facility until the **mid-2030s**.

The facility's eighth successive year of elevated CO<sub>2</sub> began in April. Three large patches of old oak-hazel forest once more began receiving air enriched with 150 ppm of CO<sub>2</sub> above the background values.

Through a partnership with innovative engineering company **RenEco**, the CO<sub>2</sub> for BIFoR FACE now comes from a much more sustainable circular economy supply, removing the facility's link to natural gas and stabilising the supply against global commodity fluctuations.

The partnership with RenEco also very generously provides funding for six PhD scholarships and funding to update the FACE control engineering to the benefit of FACE facilities worldwide.

Another very generous donation will fund a new **Assistant Professorship** in Tree Physiology/Forest Ecosystem Ecology (broadly defined) at the University, supported by two PhD students and a research technician.

The continuously expanding list of BIFoR FACE publications is available on our website, including the latest paper, on oak flowering and acorn production, led by colleagues at **Reading University**.

## Research Highlight: Building Forests for the Future

by *Rob Mackenzie, Sami Ullah and Christine Foyer*

Many uncertainties remain concerning how and where to expand tree cover, what species to plant, and how best to manage new plantations. Much contemporary forestry has been based on even-aged monocultures, largely because of perceived advantages for timber production. However, for change mitigation, future forests will have to achieve timber production (and wider ecosystem service provision) alongside resilience to biotic and abiotic challenge. Informed decisions are needed about the structure, composition, and planning of future forests, to provide environmental, economic, and health benefits to society. Genetically diverse, mixed, and irregular forests, with their higher biodiversity and niche complementarity, are promising new configurations for regulating the water cycle, storing carbon, and delivering other goods and services. <https://doi.org/10.1002/fes3.518>

Congratulations to Dr **Marine Cambon**, who has been awarded a UK Treescapes fellowship (host microorganism interaction and microbiota with a focus on Acute Oak Decline). We welcome **Furkan Tekinay** our new Data Manager and Analyst.

We say farewell to a few people this month.

Dr **Liling Chang** who will be leaving in May for a new exciting opportunity in America, however, Liling will keep a close connection to BIFoR.

BIFoR Project Officer of 10 years, **Deanne Brettle**. Deanne has been an integral part of the Institute but has decided to embark on a career in research. Deanne joins the EU Project **CARMINE** focussing on nature based solutions. We are delighted to have her remain a part of BIFoR for her PhD.

BIFoR FACE Engineer **Nicholas Harper** leaves in May. Nick has been with the project since the start in 2016 and was instrumental in setting up the FACE experiment in those early days. Nick's experience and talents have propelled the Institute forward over the years, providing countless hours of support to research and professional colleagues. Nick is retiring but has kindly offered to return at times to assist his colleagues when needed.

**Stephanie Lear** is moving on a senior role with Oxford University. She will be very much missed as she has been instrumental in guiding our relations with donors.

## International conference

Prof **John Holmes** hosted the International Conference of Three Societies on Literature and Science with over 200 speakers from around 30 countries worldwide. BIFoR was well represented with a plenary session on interdisciplinary research including **Rob MacKenzie** and a strand of panels on literary research on forests convened by **Dion Dobrzynski**. Delegates left full of praise at this ambitious and successful conference. Delegates took a tour of the BIFoR FACE facility and of Ruskin Land in the Wyre Forest. Virtual tours of both forest sites are available online.

## Stay in touch

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