

# Last Leaf Fall

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## Seeing the peat for the trees

New BIFoR discoveries shed light on restoration potential, resilience and stability of peatlands and forests

**Prof. Vincent Gauci and Prof. Nick Kettridge**

Forests and peatlands are both carbon-dense ecosystems that can occupy similar climatic zones and are both vulnerable to human activity. Indeed peat swamp forests in the tropics are vulnerable to both drainage and deforestation with consequences for their carbon balance and emissions to the atmosphere. In recent months, two BIFoR researchers have reported several discoveries on how such systems respond to changes in key factors with opportunities to improve management for carbon capture and storage.

Prof. Vincent Gauci and colleagues report results from a large multi-site study that show significant carbon retention gains can be made in drained and deforested peatlands while maintaining their use for agriculture simply by partially raising the water table. Gauci with colleagues also report that preserving SE Asian peat swamp forests in an 'intact' state confers a remarkable resilience with far lower total greenhouse gas emissions in response to drought events than local deforested peatlands. This interplay between peatlands and forest ecosystems has, in recent weeks been more explicitly examined.

Prof Nick Kettridge and colleagues report how forest and peatland ecosystems, with very different carbon dynamics and storage processes, are able to coexist across Europe. This 'bistability' results from internal ecophysiological feedbacks that support the continued persistence of the pre-existing ecosystem. Peatland ecosystems that are most threatened



The flux tower at BIFoR FACE, lit up at night by a moth trap. Photo credit: Gael Denny, Technician.

across Europe have been identified using this new understanding. This framework is now being applied to develop a country scale decision support system to target ecosystem reclamation to maximise carbon capture and storage.

Evans *et al.* 2021. Overriding importance of water table in the greenhouse gas balance of managed peatlands. *Nature*.

Deshmukh, Chandra S., *et al.* 2021. Conservation slows down emission increase from a tropical peatland in Indonesia. *Nature Geoscience* 14.7: 484-490.

van der Velde, Ype, *et al.* 2021 Emerging forest-peatland bistability and resilience of European peatland carbon stores. *Proceedings of the National Academy of Sciences* 118.38 (2021).

## Research Funding

**Prof. Frank Uekötter** has received a prestigious Advanced Grant from the European Research Council of £1.74m for The Making of Monoculture: A Global History.

BIFoR is involved with three of the six projects that have been selected to receive a share of £10.5 million from UKRI in its Future of UK Treescapes Programme.

- 1) **Dr Estrella Luna Diez** Principal Investigator alongside 4 BIFoR colleagues for MEMBRA – exploring whether trees can remember past stress conditions such as drought or disease and transfer these memories to their descendants.
- 2) **Dr Joshua Larsen** Coinvestigator with CASTOR exploring restoration of riparian woodland.
- 3) **Prof. Peter Kraftl** Coinvestigator on the project Voices for the Future – Collaborating with children and young people to re-imagine Treescapes.

## New Appointments

We congratulate BIFoR's; **Prof. Sami Ullah** recently appointed academic lead for BIFoR FACE and a BIFoR Director; **Dr Emma Ferranti** on her new role as Senior Lecturer in Civil Engineering.

We also welcome 3 new post doctoral researchers to the growing Tree Pathology Team; **Diana Vinchira** (metabolomics); **Sabrina Dhauadi** (field pathology), **Olivia Mosley** (metagenomics and transcriptomics).

## Conferences

*3rd to 4th November 2021*

**Trees for the Future – Diversity and complexity for resilience and carbon storage**

*26th & 27th January 2022*

**Transforming our understanding of global forests – BIFoR 6th Annual Community meeting.** Visit our [website](#) for more information.

