

[The Trinity College Dublin Botany Department Newsletter](#)

Herbarium

Tuesday the 8th of March is a day that will go down in the history of Botany at Trinity College Dublin, marking the visit of **Malcolm Noonan**, Minister of State at the Department of Housing, Local Government and Heritage, who has committed **1.5 million euros of funding across the next eight years** to transform, modernise, and safeguard the future of Trinity's historic herbarium.



Some of the 15 plant species lost from the Irish flora in Trinity College Dublin herbarium.

The funds provided will allow us to fully **digitise** and image the herbarium, making our c.400k collections available to the research community, and to make much-needed **improvements to the infrastructure** of the herbarium, which has expanded beyond its original footprint. Linked to the funding for Trinity herbarium are **three fully funded PhD studentships**, in partnership with Trinity College and the National Parks and Wildlife Service.

Herbarium

The 8th of March is **International Woman's Day**, so we were delighted to highlight Trinity's significant **algal collections** made by **Ellen Hutchin's**, often called '**Ireland's first female botanist.**' The minister also viewed specimens by Charles Darwin, and specimens of all 15 plant species lost from the Irish flora since records began. Finally, the minister was taught to mount a specimen of the Lesser Celandine (*Figaria verna*) by herbarium technician **Marcella Campbell**. The specimen will enter the collection, where it will be evidence of the affects of climate change on the Irish flora. Our warmer winters have led to our native species flowering ever before. Trinity herbarium contains tens of Lesser Celandine specimens dating back more than 200 years, but the specimen mounted by Minister Noonan is the first and only of this sepecies collected flowering in February.

Minister Malcolm Noonan mounting a Lesser Celandine specimen, under the guidance of herbarium assistant Marcella Campbell.



12th Postgraduate Symposium

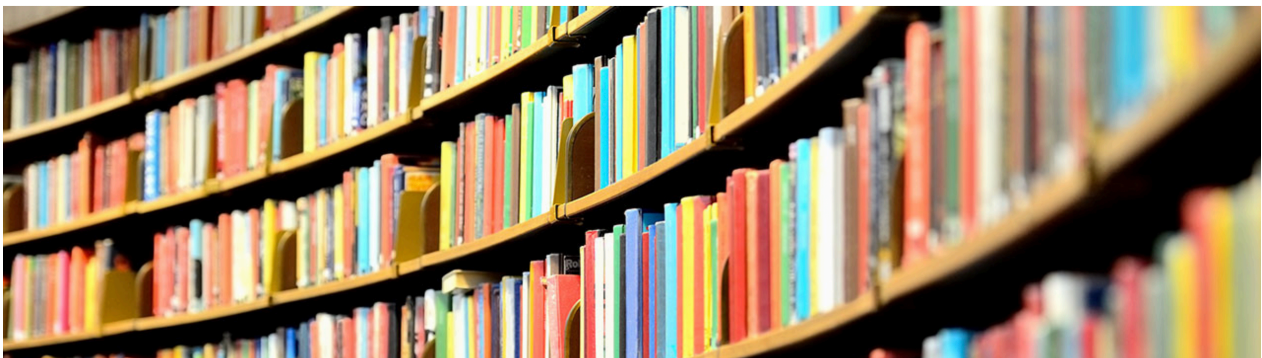
Another wonderful annual edition of the Postgraduate Symposium took place on the 2nd-3rd March! A total of **22 postgraduates from Botany and Zoology** presented their research projects with topics spanning from natural capital accounting to visual processing in animals, heatwave effects on parasites to the understanding the role of urban wild spaces in maintaining mental health. We were delighted to host **two excellent keynote speakers: Dr Sandy Hetherington**, a **paleo-botanist**, travelling from the **University of Edinburgh** to give an engaging talk on the origins of plant complexity, and **Dr Aidan O'Hanlon**, an **entomologist** at **Dublin's Natural History Museum** who made us reflect on the central role of the museum in the protection of biodiversity.



Winners with guest speakers (left to right): Charlotte Morgan (best 5 minute talk), Ian Clancy (best overall presentation), Sandy Hetherington, Aidan O'Hanlon, Aedin McAdams (best 10 minute talk) and Clinton Haarlem (Audience Choice Award).

Publications

- **Edward A. Straw**, Edel Kelly, Dara A. Stanley. [Self-reported assessment of compliance with pesticide rules](#). *Ecotoxicology and Environmental Safety*, Vol 254, (2023)
- **Knapp, J.L.**, Nicholson, C.C., Jonsson, O. *et al.* [Ecological traits interact with landscape context to determine bees' pesticide risk](#). *Nature Ecology Evolution* (2023).
- **Premrov, Alina**, Yeluripati, Jagadeesh and **Saunders, Matthew**. 2023. Insights into the CO2PEAT project: [Improving methodologies for reporting and verifying terrestrial CO2 removals and emissions from Irish peatlands](#). Irish Geological Research Meeting 2023 (IGRM2023), 3-5 March 2023. Ulster Museum, Botanic Gardens, Belfast, BT9 5AB, UK.
- **W.J. Mattheus**, **C. Chondrogiannis**, **R. Nair**, **K. Kwasniewska**, **K. O'Dea**, **C. Barbosa**, **A. Knetge**, **B. Jackson**, **J.C. McElwain**. [TERRAFORM: Trait Ecology and Biogeochemical Cycles in Deep Time](#). Irish Geological Research Meeting 2023 (IGRM2023), 3-5 March 2023. Ulster Museum, Botanic Gardens, Belfast, BT9 5AB, UK.



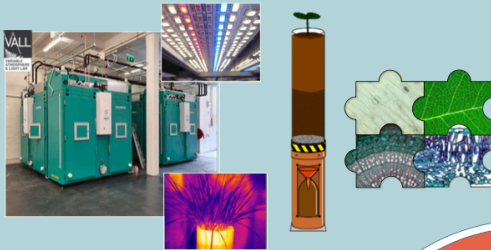
Poster presented by TERRAFORM research group
at the Irish Geological Research Meeting 2023

TERRAFORM: Trait Ecology and Biogeochemical Cycles in Deep Time

W.J. Mattheaus, C. Chondrogiannis, R. Nair, K. Kwasniewska, K. O'Dea, C. Barbosa, A. Knetge, B. Jackson, J.C. McElwain,
1 Discipline of Botany, School of Natural Sciences, Trinity College Dublin.

Growth Chamber Weathering Experiments

Plant performance influences weathering rates. We will conduct novel paleo-Earth mesocosm experiments to investigate the performance of plant-types across evolutionary gaps, under age-appropriate atmospheric conditions, and its effect on weathering rates.

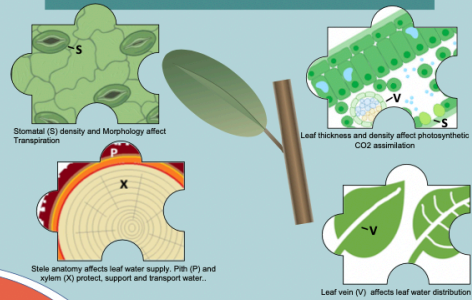


Outputs:

Plant performance, traits and weathering rates across evolutionary groups, and under different atmospheric conditions.

Paleo-plant trait ecology

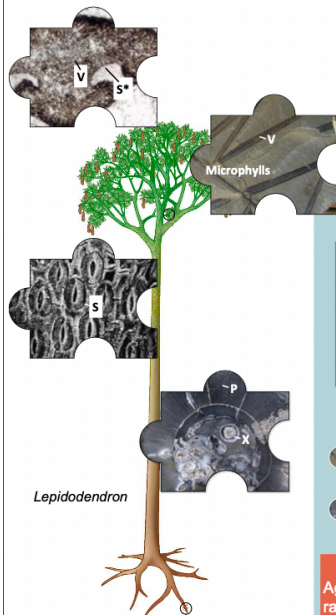
TERRAFORM will expand measurement and estimation of functional traits from plant fossils by drawing on modern trait-based ecology, and through comparison to plant performance in growth chamber experiments.



Outputs:

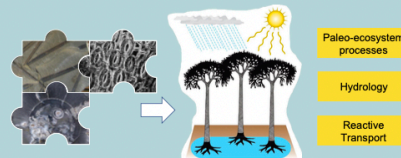
Plant-fossil-based trait values of extinct plant groups, dominant during climate transitions of the geologic past.

What is the influence of vegetation on silicate weathering?
How has it changed with the evolution of plants?



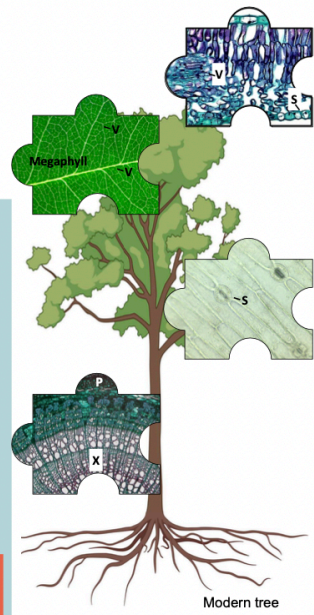
Model-based Estimation of Paleo-plant Performance and Weathering

Using novel paleo-ecosystem process simulations we will estimate the impact of paleo-plant traits on weathering and biogeochemical cycling in a cascade of models, using model-data integration from the growth chamber experiments.



Outputs:

Age-relevant extinct-plant performance, and weathering rates at regional and continental scale allowing estimation of global carbon cycle parameters in deep time.




Graphics from Canvel, Borender, Harper and Kings (2021) Topics in Geobiology; Watson et al. (2017) New Phytologist; Kelland et al. (2020) Global Change Biology; Thomas (1985) New Phytologist; Graham (1985) Annals of Botany; Mattheaus et al. (2022) Annual Reviews of Earth and Planetary Science. Special thanks to Michelle Murney, Conla J Harper, Jon D Riehey, and Sophia I Macarawich.

PALEOZOIC					MESOZOIC			CENOZOIC	
Cambrian	Ordovician	Silurian	Devonian	Carboniferous	Permian	Triassic	Jurassic	Cretaceous	




Meet our team

Poster presented by Alina Premrov at the Irish Geological Research Meeting 2023



IGRM 2023 - The 66th Irish Geological Research Meeting 03-05 March 2023, Ulster Museum, Belfast

Insights into the CO2PEAT project: Improving methodologies for reporting and verifying terrestrial CO₂ removals and emissions from Irish peatlands

Alina Premrov^{a*}, Jagadeesh Yeluripati^b and Matthew Saunders^a

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• Introduction

Peatlands in their natural condition are well known to be an important terrestrial carbon (C) sink. To understand how quickly peatlands in Ireland can absorb C after rehabilitation/restoration, it is important to study the factors that affect the release and uptake of greenhouse gases (GHGs) in these ecosystems. This is especially important because many peatlands have been altered through human activities such as drainage for energy or horticultural extraction, or conversion to forestry or agriculture. The CO2PEAT project is contributing towards this goal [1].

• About CO2PEAT

CO2PEAT - “Improving methodologies for reporting and verifying terrestrial CO₂ removals and emissions from Irish Peatlands”

Project is funded by Irish EPA under the EPA Research Programme 2021-2030. This is a three-year project, commenced in September 2022 [1].

The CO2PEAT research project aims to:

- Identify the main drivers and establish links between analysis of GHGs - i. e. CO₂ emissions/removals
- Improve our knowledge of peatland ecosystems through the utilisation of advanced modelling approaches
- Enhance our understanding of how the strength of peatland C sink is regulated by various factors [1].

• Current work

Fig. 2 provides illustrative presentation of different components of CO2PEAT work including links between data-processing and modelling.

Currently the work is focusing on gathering the data required for modelling, such as measured GHG flux data from instrumented peatland-sites, peat physical and chemical soil parameters, vegetation parameters, biomass, water-table, climate data, land-area, topography, drainage and land use/management [1].

The recent work resulted in the generated list of potentially needed variables based on information obtained from reviewing modelling studies and from data-input requirements of some of the major process-based models [1].

A variety of the EO/RS data products required for modelling have been gathered as well [1]. Where applicable, the data processing is being performed with help of programming/scripting in R and Python, some of which was developed already throughout earlier research performed by Premrov et al. (2020a,b) [2a,b].

• Acknowledgements

The authors are grateful to the Irish Environmental Protection Agency (EPA) for funding the CO2PEAT project (2022-CE-1100) under the EPA Research Programme 2021-2030.

LITERATURE

[1] CO2PEAT, 2023. <https://co2peat.wixsite.com/co2peat>

[2a] Premrov, A., Saunders, M., Renou-Willson, F. (2020). Biogeochemical modelling of Irish peatland sites -insights into the processing procedures of daily climate input data obtained from ICHEC WRF climate datasets. https://www.researchgate.net/publication/35734323_Biogeochemical_modelling_of_Irish_peatland_sites_-_insights_into_the_processing_procedures_of_daily_climate_input_data_obtained_from_ICHEC_WRF_climate_datasets

[2b] Premrov, A., Saunders, M., Renou-Willson, F. (2020). Biogeochemical modelling of Irish peatland sites -insights into the procedures for estimating potential evapotranspiration for long-term average climate input data. https://www.researchgate.net/publication/35734241_Biogeochemical_modelling_of_Irish_peatland_sites_-_insights_into_the_procedures_for_estimating_potential_evapotranspiration_for_long-term_average_climate_input_data

[3a] Connolly J., Nicholas M. H. (2009) Mapping peat soils in Ireland: updating the derived Irish peat map, Irish Geography, 42,3, 343-352, DOI: 10.1080/00150770903407989

[3b] Connolly J., (2015) The Derived Irish Peat Map version 2 – source: <https://research.wixsite.com/johnconnolly/downloads>

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• Approach

CO2PEAT project is working on the development of a research framework (with project overview presented in Fig.1) that will complement and enhance current approaches in the reporting of CO₂ emission and removal estimates for peatlands at the national level.

The research focuses on the utilisation of statistical and advanced process-based modelling methods, in combination with the integration of advanced observational data streams (Fig. 1, Fig. 2), aiming to improve our knowledge of peatland ecosystems and our understanding of how the strength of peatland C sink is regulated by various factors at different timescales and climate scenarios [1].

• Current work

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Fig. 1 Illustrative presentation of CO2PEAT research project overview (WP... work packages) [1]



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Fig. 2 Illustrative presentation of different components of CO2PEAT work including data-processing and modelling

Note: Top right & bottom - adapted from Premrov et al. (2020a,b) [2a,b]; top left - map of peat soils from Connolly et al. (2009) & Connolly (2015) [3a,b].



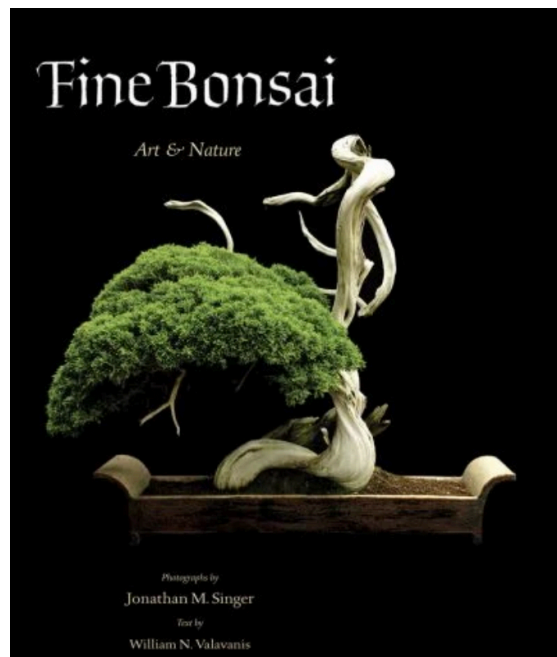
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Phytobooks

Fine Bonsai: Art & Nature

Through the lens of renowned botanical photographer **Jonathan Singer**, this magnificent volume is the result of an extensive photographic campaign, in the course of which Singer was granted **unprecedented access to the most respected public and private collections in Japan and the United States**, including the mecca of bonsai, the Omiya Bonsai Village of Saitama, Japan, where photography is normally prohibited. **Three hundred stunning full-page images and four lavish gatefolds present bonsai of all types, from quiet representations of nature to bold sculptural forms.**



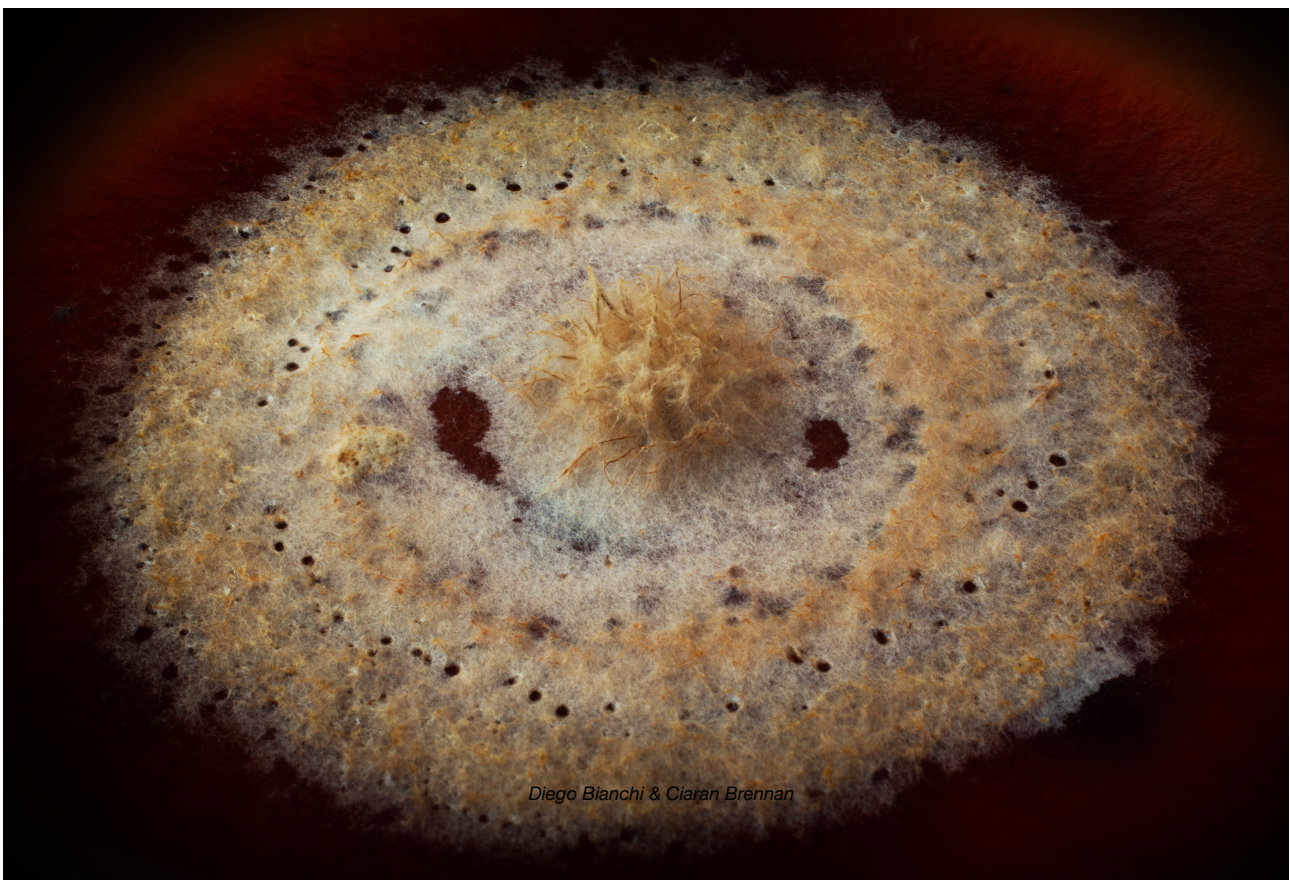
This book will be presented at our Library during a coffee break in April. Stay tuned!



Phytoart

This is a macro photograph of an endophytic filamentous fungus isolated from the roots of a *Taxus baccata* and that was identified by sequencing as a member of *Ilyonectria* genus. The photograph, shot and edited by **Diego Bianchi** and **Ciaran Brennan**, is an entry that was submitted for the **FungART competition**, which takes place at the **Fungal Update: Mycology 2023** conference.

The picture has been selected, printed and exposed at the QEII Conference Centre, London (24th and 25th March). A jury will evaluate all the artworks. A winner has not been announced yet. **The hardest part was to give it a title without being trivial.** Then, the idea... ladies and gentlemen: *What the Fung?!*



Diego Bianchi & Ciaran Brennan

! WE ARE ALL PHYTOBYTES !



Thank you for your contributions!

If you think that you have any news that should be posted in our newsletter,

please send an email to the **editor**

Diego Dylan Bianchi - dbianchi@tcd.ie

