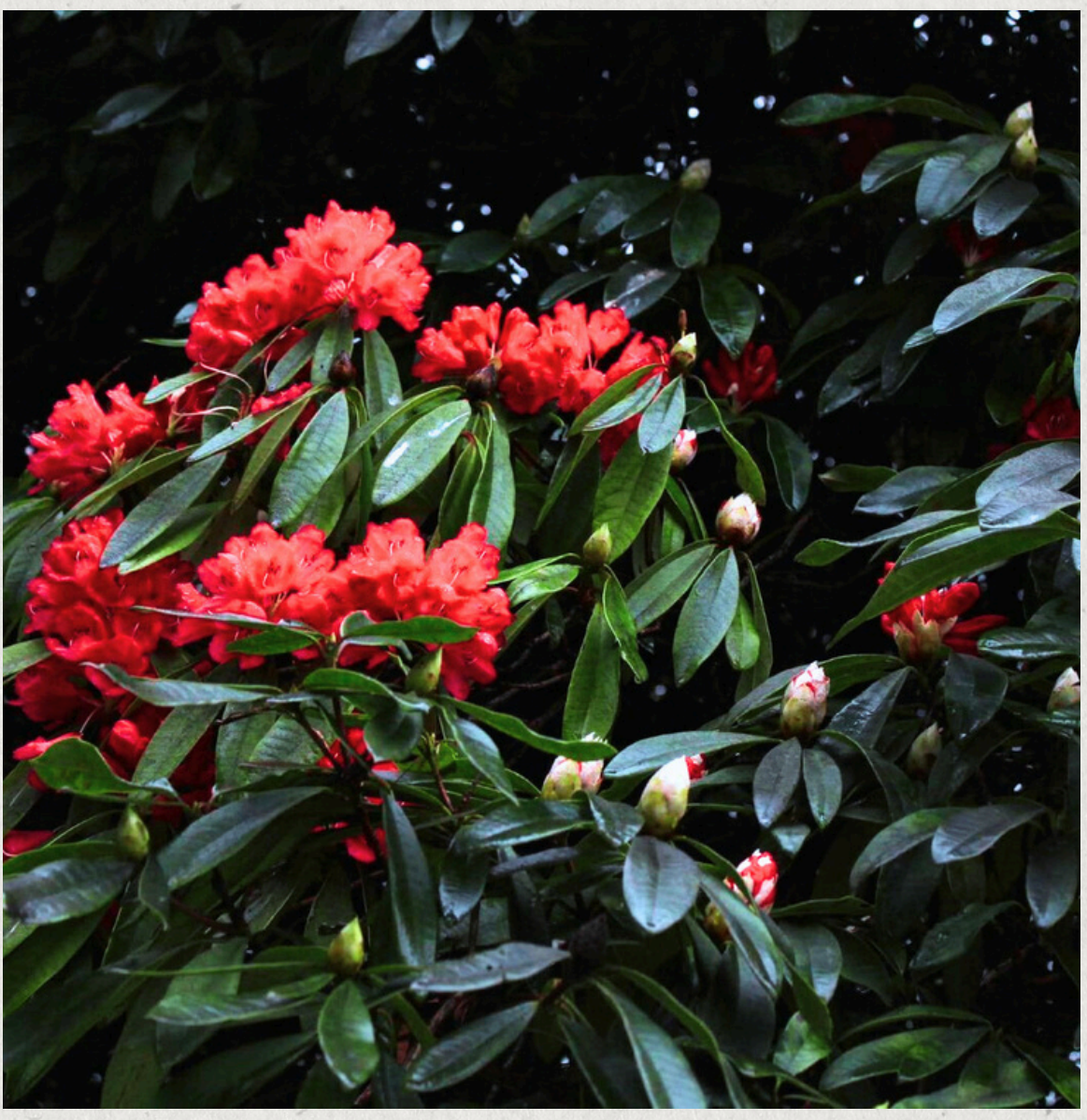
Phytobytes

Botany's newsletter, Trinity College Dublin



COVER BY

ANTONIETTA KNETGE

March-April 2024

People

We're excited to welcome **Tina Monteiro** and **Morgane Weissenburger** to the **Plant Climate Interaction Lab** at Trinity College Botanical Garden! They have joined us for their Erasmus Internship, and here's a little introduction from each of them:

"Hi, my name is Tina! I'm a French masters student undertaking a six-month internship at Trinity College Botanic Gardens. My focus is on the conservation of threatened and endemic Irish species.
The goal of my project is to create a map targeting these species in Ireland, which will help expand the seed bank. This information will guide collection efforts and contribute to the preservation of plant diversity, which is currently in decline. Seed banks are a cost-effective way to conserve plant diversity in the long term.
For my master's thesis, I aim to provide a broader overview of Irish threatened species and explore the role of botanic gardens in their conservation. Additionally, I will participate in the Witness Tree project starting in June."

"Hi there! My name is Morgane, and I'm a French student pursuing a master's in Botany at the University of Poitiers. As part of my final year, I'm thrilled to be interning at Trinity Botanic Garden.
My project focuses on public engagement in international botanical gardens. I'll be selecting data from various botanic gardens to compare their educational activities. Using this information, I aim to develop a self-guided tour tailored for university students, aligning with their curriculum. Additionally, I'll contribute to the Witness Tree project, supporting long-term ecological and environmental monitoring."

We're looking forward to the contributions Tina and Morgane will make to our research and projects here at Trinity College Botanical Garden!

Midori Yajima Begins Ph.D. with Plant Ecology Modelling Group

After leaving her previous role in Trinity College Botanic Garden, **Midori Yajima** has started her new position as a Ph.D. student with Silvia Caldararu, as part of the **Plant Ecology Modelling Group**.

Her project, **PhenoShift**, will focus on whole plant phenology and integrating datasets at different scales with land surface models. "From species to ecosystem phenology in a changing climate"

This exciting venture marks a new chapter for Midori as she delves into the intricate dynamics of plant phenology and its broader ecological implications. We wish her all the best in her Ph.D. journey with the Plant Ecology Modelling Group!

WELCOME BACK MIDORI

Left to right Josua Seitz, Gabriela Sophia, Silvia Caldararu and Midori Yajima

News

After a few quiet months, March saw the return of two of our postgraduates: **Pongsakorn Kunasit (Cesar)** and **Thibault Diureaux**. Here's a summary of their research stays in Thailand and France, respectively:

Pongsakorn Kunasit (Cesar)

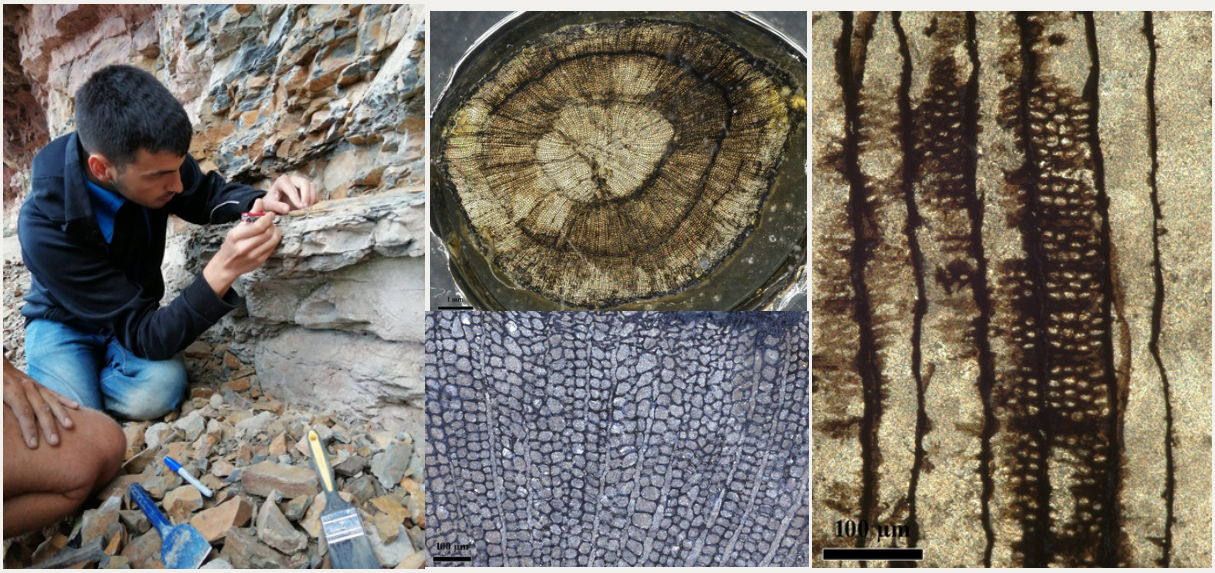
Cesar collecting samples

Cesar preparing the herbarium

"During the last winter, I was away in Thailand to do fieldwork and to further examine herbarium specimens in regional herbaria. The fieldwork successfully happened across the country (from the North to the South), with my old colleagues' help. It was so exciting to see and explore different habitats of the plant. Everything went well in the three months, especially the herbarium work."

We're proud of the work our postgraduates are doing and look forward to more updates on their research endeavours!

Thibault Diureaux - The study of 360-million-year-old Irish fossils



Left: Thibault hunting fossils during the 2022 fieldwork; Middle top: Cross-section of a *Callixylon* root; Middle bottom: Detail of *Callixylon* wood in cross-section; Right: Wood tracheids in radial section showing the typical pitting pattern of *Callixylon*

"From January to February 2024, I worked during a research stay at the AMAP research unit (Botany and Modelling of Plant Architecture and Vegetation) in Montpellier (France) to study anatomically preserved fossil plants, which are 360 million year old (Fammenian, Late Devonian). The fossils were collected in County Wexford over the course of two field trips in September 2021 and September 2022 by a team composed of researchers from Irish (including myself), French, and Belgian institutions. The AMAP research unit has a specialised Paleobotanical lab to prepare fossil material to be made into thin-sections – allowing us to see the incredible cellular preservation of these ancient plants. Material collected in these field trips has already led to great discoveries such as the oldest evidence of a tyloses, a plant defence mechanism located in the wood that reduces pathogen's spread and embolism (https://doi.org/10.1038/s41477-023-01394-0).

My aim during my stay in France was to document, through transmitted light microscopic imaging, and prepare specimens that had been preliminarily recognized as possessing abundant wood. I also studied other fossils in the assemblage, allowing me to find more specimens to include in this project and potentially new species (at least new in Ireland) that will be further investigated in the future.
An important result is the discovery of the first anatomically preserved specimens of Callixylon from Ireland. Callixylon is a fossil plant genus corresponding to the anatomically preserved stems and roots of one of the earliest trees in Earth's history, Archaeopteris. Archaeopteris is also important in plant evolution because it belongs to the sister group of today's dominant group of plants, the seed plants.
Future work will include a detailed description of the specimens and a comparison with already described Callixylon species. The new fossils are also expected to provide a better understanding of the rooting systems of these plants. This work will thus increase our knowledge of the diversity and the biology of a fossil genus that had a major role in past ecosystems"

Tree of the month - The Common Lime

A brilliant article this month describing the Common Lime was written by Katie Byrne of the Public Affairs and Communication Team with thanks to John Parnell, David and Stephen Waldren and Michelle Murray for their expertise. You can read the article here.

Update on Anne Dubéarnès

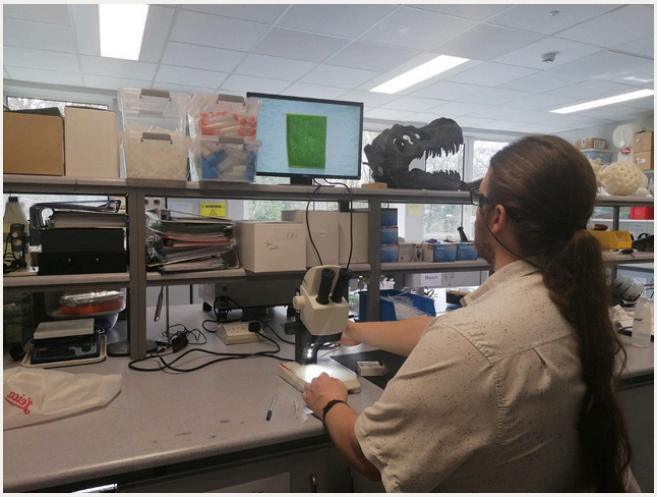
Many of you will remember **Anne Dubéarnès**, a former Ph.D. student of John Parnell's and Trevor Hodkinson who edited Phytobytes for a number of years. Anne is just finishing up working as a Special Collections Researcher in the University of Cambridge's Herbarium before taking on her new permanent job at the large herbarium in Lausanne, Switzerland. Before leaving Cambridge, Anne has made a really excellent YouTube video on how plants get their names.

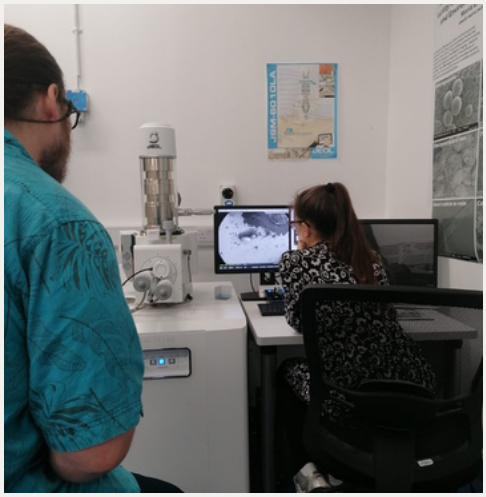
You can watch the video here.

We wish Anne all the best in her new role and look forward to seeing more of her excellent work!

A pilot project in experimental taphonomy

Researchers from the TERRAFORM team visited University College Cork in March to carry out a pilot project in experimental taphonomy with collaborator Maria McNamara. Postdoc **Will Matthaeus** and PhD student **Catarina Barbosa** are interested in testing hypotheses regarding the effect of certain aspects of the process that plant parts undergo in the transition between life and preservation in the fossil record (i.e., taphonomy). Maria is a leading expert in the interpretation of the fossil record using experimental alteration of biological materials. The group aims to develop robust interpretations of signals from the plant fossil record for use in ecosystem simulations.





Ian Clancy Represents TCD Eco-Physiology Group in Brussels Workshop

In March, **Ian Clancy** represented the **TCD eco-physiology group** in Brussels for a workshop with the Mothership Project (James Hutton Institute) and other members from European Universities. Theworkshop focused on developing eco-physiological parameters for peatlands under different land uses across Europe using the *bigleaf* package in R.

The workshop entailed discussions on the way we monitor, process, and statistically analyse greenhouse gas (GHG) data from terrestrial ecosystems, with a goal of using these datasets to feed into bigleaf to quantify the eco-physiological parameters across different spatial and temporal scales. The workshop was held in Scotland House, and below is a photo from where the meetings took place looking onto the EU parliament. It was a productive event aimed at advancing our understanding of peatland ecosystems and their responses to different land uses across Europe.

Botany research at European Geosciences Union (EGU) General Assembly in Vienna!

The week of the 15th of April was very quiet in the botany building with a sizable cohort of researchers in Vienna presenting their works to over 18 thousand attendees. For the Terraform Project **Katie O'Dea** in collaboration with **Christos Chondrogiannis** presented their poster on the effects of using concrete dust on oats and barley in field conditions during the enhanced rock weathering and river alkalinity enhancement for carbon dioxide removal. Christos also convened the session. The information from the meeting gave insights into potential of a carbon capture technology, reducing GHG emissions and strived inform decision-making on how these technologies can help with reaching the climate targets. William Matthaeus co-convened the Co-evolution of life, biogeodynamics and trait-based paleoecology over deep time panel.

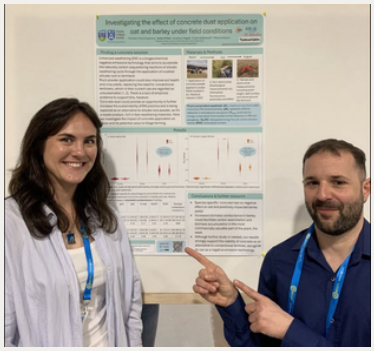
Alina Premrov and **Matthew Saunders** convened and co-convened the "Integrated Modelling Approaches and Data Integration: Exploring Ecosystems, Landscapes, Soil Health, Degradation and Living Labs" session in addition to discussing their new R package 'miniRECgap' for simple gap-filling of Eddy Covariance CO2 flux data in an R environment.

Richard Nair and **Silvia Caldararu** also convened and co-convened the "Vegetation and ecosystem responses to global change - function and carbon-water relations" with Richard also presenting Water availability controls seasonal shifts in root growth timing.

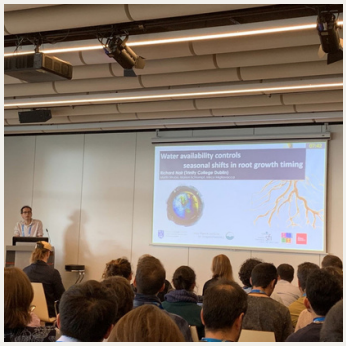
Saté Ahamad presented his talk on "Small-scale spatial relationships between peat properties and surface microtopography in minerotrophic peatlands depend on management regimes" as part of the DIVE2STORE project.

Stephen Byrne discussed his research as part of the ADAPTForRes project "Assessing Forest resilience and carbon dynamics in differing Irish forest types to promote more sustainable sinks".

Josua Seitz for the Plant Ecology Modelling Group presented their poster titled "Improving seasonal carbon dynamics in contrasting Mediterranean and Alpine grasslands" while Ian Clancy of TCD eco-physiology group presented theirs titled "Greenhouse gas fluxes from grassland on organic soil used for beef grazing in the Irish midlands".



Katie & Christos



Richard

Saté

Postgraduate Workers' Organisation (PWO) – Walkout

This month saw the PWO walkouts across Trinity which was heavily supported by botany staff and students alike. The strike occurred throughout the 10th of April and called for action on four core demands, including worker's rights, in which the PWO specify sick leave, parental leave and labour law protections. In addition to a guarantee of a liveable wage, respect in the workplace, and fair treatment for non-EU and disabled PGRs. Future editions of Phytobytes will contain more news regarding this, for more information please click here.

Ed Straw this month had two articles published in the Irish Farmers Journal. Both these articles discussed issues around pesticide use in Ireland. For the online only article titled "Pesticides are more than just the main ingredient", Ed writes about how the active ingredient is a small part of a pesticide. Co-formulants which help the product to work are a large part of the ingredients. Delving into the lack of regulation and need for change. In addition, for the print only version of the Irish farmers journal Ed writes about "How to Protect yourself when mixing or applying pesticides" a brilliant dive into the health risks associated with the application of modern pesticides. Both these articles build on Eds previous work "How to Protect yourself when mixing or applying pesticides" all a brilliant example of science communication.

Amornrat Prajaksood, a former Ph.D. student of John Parnell's and now a lecturer in Khon Kaen University, Thailand has just published, along with John, a paper in Kew Bulletin. The lead author is one of Amornrat's postgraduate students in Khon Kaen. The paper surveys the seeds of 45 species and infraspecies of Eriocaulon from Thailand using light microscopy and SEM. It radically expands on Amornrat's and John's original study of the morphology of the seeds of the Eriocaulaceae and describes many taxonomically useful features, some of which are novel.

Events

13th TCD Botany-Zoology Postgraduate Symposium Recap

The 13th edition of the TCD Botany-Zoology Postgraduate Symposium took place on the 7th and 8th of March in the Botany Library. The talks reflected the wide range of research carried out by the two Departments, and included a post-doctorate panel where our own **Saté Ahmad**, **William Matthaeus,** and **Edward Straw** provided career advice and engaged in an honest discussion on the pros and cons of a post-doctoral career.

Keynote speakers welcomed this year were **Anja Murray**, an ecologist with an extensive career in policy and media, and **Dr. Cordula Scherer**, a marine ecologist currently in charge of the IRC-funded project Food Smart Dublin with Trinity Centre for Environmental Humanities. It was a stimulating event showcasing the diverse research being conducted within the Departments and providing valuable insights into career paths in academia and beyond. More information is available on the EcoEvo blog.

Left to right: Antonieta, Clinton, Anja, Cordula, Kathleen and Simon

Publications

Martini, F., Chen, YF., Mammides, C. et al. 2024. Exploring potential relationships between acoustic indices and ecosystem functions: a test on insect herbivory. Oecologia. https://doi.org/10.1007/s00442-024-05536-9

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McElwain, J.C., Matthaeus, W.J., Barbosa, C., Chondrogiannis, C., O' Dea, K., Jackson, B., Knetge, A.B., Kwasniewska, K., Nair, R., White, J.D., Wilson, J.P., Montañez, I.P., Buckley, Y.M., Belcher, C.M. and Nogué, S. (2024), Functional traits of fossil plants. New Phytol, 242: 392-423. https://doi.org/10.1111/nph.19622

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URL: https://www.researchprotocols.org/2024/1/e50733
DOI: 10.2196/50733

S. Philip, P. McDermot, **E. Cooper**, V. Coates, M. McCann Comorbid Chronic Diseases and Ventilatory Support in COVID-19 Hospitalisations. Irish Medical Journal; March 2024; Vol 117; No. 3; P928, Comorbid Chronic Diseases and Ventilatory Support in COVID-19 Hospitalisations – Irish Medical Journal (imj.ie)

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Short, A. W, Sunoj, J. V. S, **Huang, J**, Wang, G, Dassanayake, M, Finnegan, P. M., Parker, J. D., Cao, F-C, Wee, AKS. Comparative transcriptomics of the chilling stress response in two Asian mangrove species, *Bruguiera gymnorhiza* and *Rhizophora apiculata*, Tree Physiology, Volume 44, Issue 3, March 2024, tpae019, https://doi.org/10.1093/treephys/tpae019

Wantongsuk, B., Parnell, J.A.N. & Prajaksood. A. (2024). Seed morphology of *Eriocaulon* (*Eriocaulaceae*) in Thailand. Kew Bulletin, 78: DOi 10.1007/s12225-023-10161-5.

Phytoart

Climate Art Project is a multidisciplinary project between art, science and activism, conceived by the visual artist and environmental engineer **Andreco,** inspired by the latest scientific and social research on Climate Change. The project, started in Paris, in the 2015, during the Cop21 conference on Climate Change, the Paris Agreement and the global Climate March. The Climate Art Project is composed of a series of interventions that took place in different cities worldwide; The aim of the project is to raise awareness on Global Warming and to disseminate the Nature Based Solutions and the best practices for Climate Change adaptation and mitigation.

Moving between art and science, they deal with performances, installation but also scientific work, bringing together a transdisciplinary team. See their latest publication on Nature scientific report at
Conte, A., Pace, R., Li, Q. et al. Aula Verde (tree room) as a link between art and science to raise public awareness of nature-based solutions. Sci Rep 14, 2368 (2024).

Need help?

TCD has a dedicated space for student and staff health and wellbeing, from physical to mental. Find all the resources here: https://www.tcd.ie/healthytrinity/

All staff, students and visitors have a role to play in making Trinity an inclusive and egalitarian community. The university has also developed dedicated offices who specialize in equality-related matters. The EDI representatives for the Discipline of Botany are **Silvia Caldararu (caldaras@tcd.ie)** and **Rebecca Riveira (riverar@tcd.ie)**

Thanks for reading!

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Call for cover art

We are looking for different art (preferably related to botany) for the cover every issue. Please do not hesitate to send us a photo of your drawing/arts! There is no deadline for this. Email us anytime!