PHYTOBYTES

JUNE 2022

The Trinity College Dublin Botany Department Newsletter

Accomplishments

Congratulations to **Dr. Richa Marawha** **for achieving her PhD at UCC!**

With a thesis in *National farm scale estimates of grass yield from satellite remote sensing,* supervised by **Dr Fiona Cawkwell** and **Dr Stuart Green**.

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JUNE 2022

Awards

Congratulations to **Andrew Neill** for winning an **EPA-Fulbright Student Award** to spend **7 months at Stanford University**, **California,** starting in September 2022. Andrew will be working in **Prof. Gretchen Daily**'s lab group to develop **ecosystem service models for Irish case-studies**. Press release ***here***.

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PostGraduate Symposium 2022 - 11th Edition

We did it again! 🏁

Thanks everyone for coming and joining another memorable edition of the PostGraduate Symposium. There were a lot of fruitful discussions and amazing presentations. **If you have missed it** or you would like to watch again the highlights, check out our Twitter account @TcdZobo - hashtag: **#ZoBosymp2022.**

Well done everybody,
and congratulations to the winners of this 11th edition:
Katrin Schertenleib, Niamh Mc Cartan and Elena Zioga.

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Where will you be 40 years after your PhD?

Congratulations and thanks to all the postgrads for the fantastic Symposium. While you were enjoying well deserved drinks in the Pav on Friday evening this motley crew met in **Kennedys**. They were all doing their PhDs in the early **1980s** and regularly met in Kennedys on Friday evenings. **I hope you took some photos in the Pav so that you can review them in 40 years' time!**

Left to right: Steve Waldren (completed his PhD in Cardiff but still frequented Kenndeys in the 1980s), Fraser Mitchell (PhD with Richard Bradshaw), Des Higgins (Botany undergrad and PhD in Zoology with Robert Blacketh, now Professor of Bioinformatics at UCD), Sue Iremonger (PhD with Daniel Kelly, now at the Forest Service), Rosemary Collins (PhD with Mike Jones, recently retired from Aberystwyth University).

PHYTOBYTES JUNE 2022

Job opportunities

Postdoc: Evolution of temperature-regulated flowering time in grasses.

A two-year postdoctoral position is available in the **Preston lab** at the **University of Vermont (USA)** to work on the **evolutionary genetics of high and low temperature-regulated flowering in grasses.** Review of applications will be begin in early August until the position is filled. An overview of the project below:

The Preston lab is looking for a biologist with a strong interest in the macroevolution of plant phenology from a developmental, genomic, and ecological perspective. Applicants should have a PhD in evodevo, plant adaptation, plant genomics, phylogenetics, bioinformatics, or equivalent, and should have a strong research record in their field. **The position will mainly focus on analysis of genomic and transcriptomic datasets, but might also involve experiments to reveal and validate candidate genes implicated in flowering time evolution**. The candidate will also have the opportunity to interact with collaborators at the Norwegian University of Life Sciences.

To apply, please send a single PDF containing a current CV, the name and contact details for two referees, and a cover letter explaining your suitability for the position to Dr. Jill Preston (Jill.Preston@uvm.edu)

Publications

Andrew Neill and **Jane Stout** have co-autored a paper lead by **Prof. Holden** (UCD), entitled *Biocircularity: a Framework to Define Sustainable, Circular Bioeconomy* - at this link to the Journal ***Circular Economy and Sustainability***. This paper aim to discuss what a sustainable circular bioeconomy might look like by creating a concept of “biocircularity”.

Job opportunities

On behalf of: Duarte Dionísio Figueiredo - *figueiredolab.com*

Positions: one PhD and one Post-doctoral position.
Where: Max Planck Institute of Molecular Plant Physiology, Germany
Starting date: as soon as possible (no deadline for submission)
Fundings: Federal Ministry of Education and Research - *bomb.de*

Our group is interested in understanding the **mechanisms required for the formation of autonomous endosperms**, which are characteristic of apomictic reproduction. In this project the candidates will investigate such pathways and design strategies for their **engineering in crops**, tighter with our partners at the IPK in Gatersleben - *ipk-gatersleben.de*

We are looking for motivated individuals **with education in molecular biology**, **genetics** and **bioinformatics is an asset**, **but not required**. A good level of English is required both written and spoken. Please submit your applications to *figueiredo@mpimp-golm.mpg.de* with the following documents: motivation letter, CV (with publications), names of at least two academic referees.

Publications

Cian White has authored a paper with **Marcus Collier** and **Jane Stout**, entitled *Anthropogenic Induced Beta Diversity in Plant–Pollinator Networks: Dissimilarity, Turnover, and Predictive Power,* available in ***Frontiers in Ecology and Evolution***

PHYTOBYTES

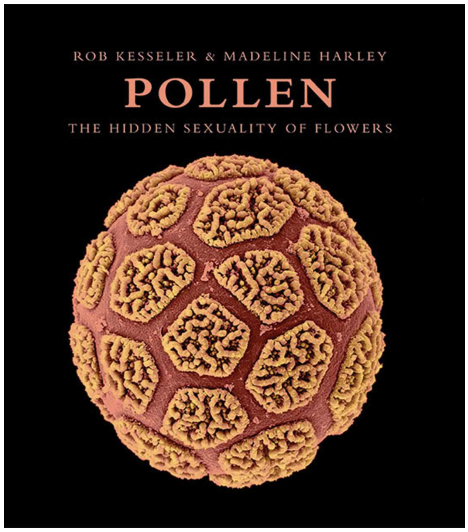
JUNE 2022

Phytobooks

POLLEN - The Hidden Sexuality of Flowers by Rob Kesseler & Madeline Harley

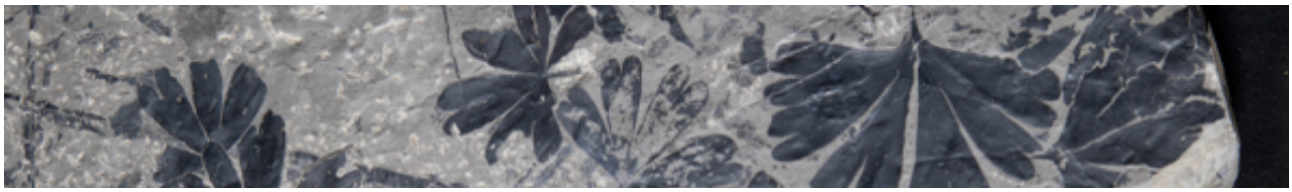
A collaboration between an artist and a scientist exploring the exquisite world of pollens, which have evolved unique and perfect designs through the . This book consists of 264 pages, illustrated in full colour.

This book will be available for viewing in the Library of the Botany Building (4th-14th July).



Conferences

Well done to **Bea Jackson** and **Thibault Duriex** who presented their project updates at the **11th *European Palaeobotany and Palynology Conference***, in Stockholm, Sweden, 19-22 June. On the next page, you can enjoy a very well done poster presented by Bea, on the ***Reconstruction of atmospheric CO2 concentration during the Devonian using fossil plant traits.***



PHYTOBYTES

JUNE 2022

Bea Jackson, Thomas Algeo, Carla Harper, Patricia Gensel, Zhenzhu Wan, Jennifer McElwain

Poster presented at the 11th *European Palaeobotany and Palynology Conference*

Reconstruction of atmospheric CO_2 concentration during the Devonian using fossil plant traits

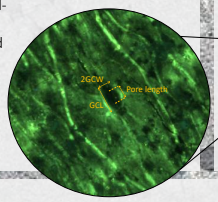
Bea Jackson [1], Thomas J. Algeo [2], Carla J. Harper [1], Patricia G. Gensel [3], Zhenzhu Wan [4], Jennifer C. McElwain [1].
[1] Department of Botany, School of Natural Sciences, Trinity College Dublin, Dublin 2, Ireland. [2] Department of Geology, University of Cincinnati, Cincinnati, OH 45221-0013, USA. [3] Department of Biology, University of North Carolina, Chapel Hill, NC 27599, USA , [4] Saudi ARAMCO, EXPEC Advanced Research Center, Dhahran, 31311, Saudi Arabia.

Introduction

The Devonian period was a key phase in plant evolution, distinguished by the appearance of a number of novel traits such as leaves, as well as the emergence of more complex ecosystems. During this time, largescale carbon cycle perturbations occurred, however there is a paucity of estimates for atmospheric CO_2 concentrations. This project aims to use the mechanistic model of Franks *et al.* (2014) to improve current understanding of palaeoatmospheric CO_2 concentrations over the Devonian.

Materials and Methods

Stomatal traits were directly measured from the fossilised cuticle of 21 hand specimens of *Sawdonia* from the Campbellton Fm., New Brunswick and the Battery Point Fm., Gaspé, Canada. $\delta^{13}C$ values for the fossil plants were obtained from Wan *et al.* (2019) and $\delta^{13}C$ air values were provided by Tom Algeo. The carbon assimilation rate (A_0) was estimated from extant terrestrial tropical-Subtropical, full-sun lycophytes (Brodribb and Holbrook, 2006; Carriqui *et al.*, 2019; Kennedy, Gensel and Gibling, 2012).



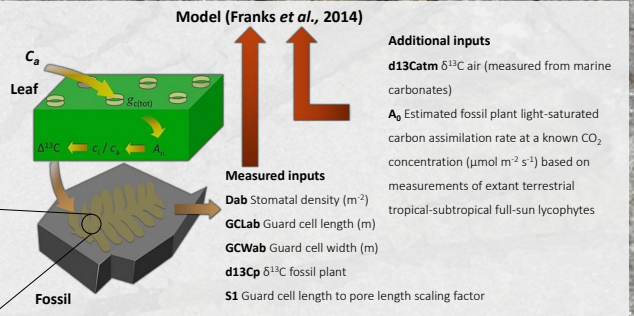


Figure 1. Summary of model inputs used. Adapted from Franks *et al.* (2014).

Results

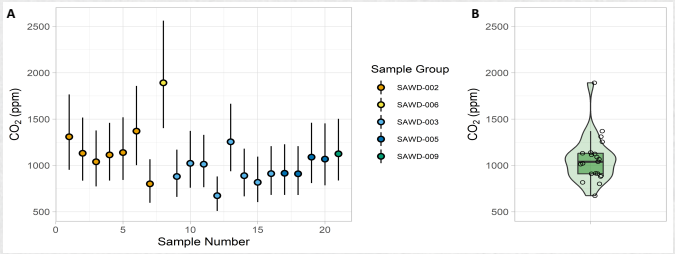


Figure 2. Average CO_2 estimates obtained for the Emsian (402.3 mya) from *Sawdonia* fossils. (A) The points show the average CO_2 estimates and the lines show the 16th and 84th percentile confidence intervals for the estimates from each sample. 10 observations were made per rock specimen. **(B)** The boxplot shows the **median CO_2 estimate (1040 ppm).** The sample groups SAWD-002 and 006 are from the Campbellton Fm.; groups SAWD-003, 005 and 009 are from the Battery Point Fm. The phylogenetically corrected $\delta^{13}C_{fossil}$ values and A_0 = 4.9 μmol m^{-2} s^{-1} inputs were used.

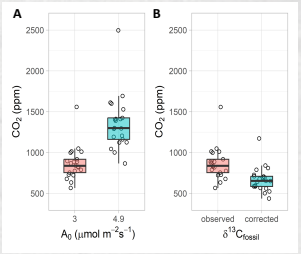


Figure 3. Model Sensitivity to A_0 and $\delta^{13}C_{fossil}$ inputs. (A) Using the mean A_n value ecologically equivalent lycophytes **increases the median CO_2 estimate by 461 ppm. (B)** Using the phylogenetic correction factor of Porter *et al.* (2017) **decreases the median CO_2 estimate by 185 ppm.**

Discussion

- The median CO_2 estimate (1040 ppm) lies within the 68% confidence interval of Foster, Royer and Hunt (2017) [1014, 2536].
- Future work will use additional fossil plant taxa to address gaps in the CO_2 record *(Fig. 4)*
- Fossil organisms associated with the *Sawdonia* specimens *(Fig. 5)* will be used to better constrain the $\delta^{13}C$ air parameter

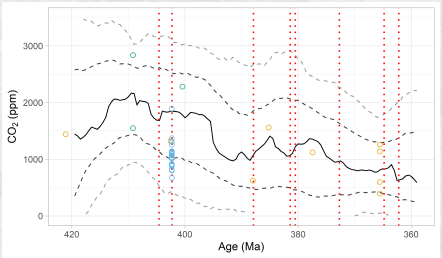


Figure 4. CO_2 estimates for the Devonian. Estimates obtained in this study are shown in blue. Values from published paleosol and plant-proxy studies (Foster, Royer and Hunt, 2017) are shown in orange and green, respectively. The most likely LOESS fit through the published data, is shown as the black line, with 68 and 95% confidence intervals shown as dark and light grey bands (Foster, Royer and Hunt, 2017). Dotted red lines indicate future data collection from fossil plant material.

Unknowns

Figure 5. Unknown fossil organisms. (A) Image of fossils found on *Sawdonia* (sample group SAWD-003) from the Battery Point Fm. Scale bar = 500 μm. **(B)** Photograph taken using epi-fluorescent microscope.

References
Brodribb and Holbrook (2006) *Plant, Cell & Environment*, **29(12)**, 2205-2215.
Carriqui *et al.* (2019) *New Phytologist*, **222(3),** 1256-1270.
Foster *et al.* (2017) *Nature Communications*, **8,** 14845.
Franks *et al.* (2014) *Geophysical Research Letters*, **41(13),** 4685-4694.
Kennedy, Gensel and Gibling (2012) *Palaios*, **27,** 424-438.
Porter *et al.* (2017) *Geochimica et Cosmochimica Acta*, **213,** 517-533.
Wan *et al.* (2019) *Palaeogeography, Palaeoclimatology, Palaeoecology*, **531(A)**, 109100.

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

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JUNE 2022

Athena SWAN/EDI Newsletter

2022 Trinity College Dublin Equality, Diversity and Inclusion (EDI) Survey

Thank you to everyone who submitted their responses to the **2022 Trinity College Dublin Equality, Diversity and Inclusion (EDI) Survey**. The results of the survey are integral to our understanding of how staff view EDI within college and therefore its significance cannot be overstated. We expect to have feedback from this by the end of the summer, which will then be used by the EDI committee to shape the School of Natural Sciences Athena SWAN silver award application.

Pride in Research

On the 16th June **#TCDPrideInResearch** hosted their first ever in-person event, where LGBTQ+ staff, students and allies took to the stage to share their research. The event was a great success, and you can find highlights from the day over on twitter @PRIDEinResearch.

Resources

Understanding Pronouns: The LGBT Life Center provides a useful guide to understanding people's pronouns and why they are important. We encourage everyone to read the below webpage, whether you are familiar with pronouns already or are unsure how to use them correctly. Furthermore, adding your pronouns to your email signature creates space for others to share theirs too. Including a ***hyperlink*** to the guide can also be valuable, encouraging learning and inclusivity. If you would like more information, please view our ***website***.

You can contact the Athena SWAN/EDI committee at **fraser.mitchell@tcd.ie**

Athena SWAN Bronze Award
School of Natural Sciences
Trinity College Dublin
Recognising advancement of gender equality: representation, progression and success for all.

Phytoart - *Margaret Mee* (1909-1988)

Margaret Mee was an **English pioneering botanical artist** who produced hundreds of botanical paintings, and specialised in the **flora of the Amazon forest**. In **1952**, at the age of 42, she left England to go and live in Brazil, along the River Amazon and in the Amazon rainforest. She has been painting and study this flora for over 30 years, and she also found and recorded new plants which are now named after her. Many of her books are out of print, but this one is currently under review for another edition so you may be interested in keeping an eye on it (***Flowers of the Amazon Forest: The Botanical Art of Margaret Mee***).

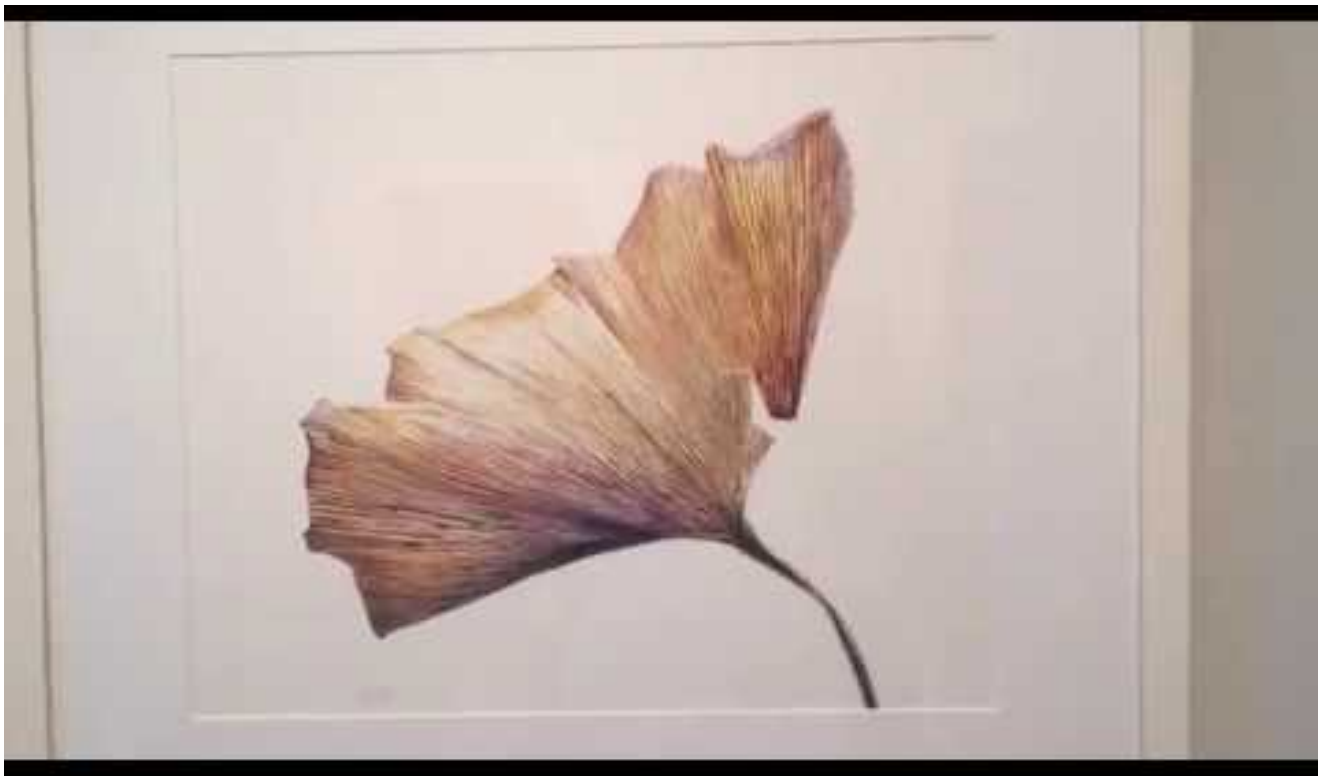
There is a movie dedicated to her: ***Margaret Mee and the Moonflower,*** and if you click on the picture below trailer should begin). It is available on streaming.

Phytoart - Jessica R Shepherd

Self-identifying as the 'Rebel Flower Painter', Jessica R Shepherd is one of the world's leading botanical painters, creating works that are known for their capacity to bring audiences closer to the mystical, the irrational and the sublime.

She established **Inky Leaves Publishing** in 2017, and placed the botanical kingdom in the spotlight with her solo show (**Leafescape**) of over **30 new watercolour paintings** at **Abbott and Holder, in London**. For this exhibition, Jess explored her vision of a botanical dystopia, challenging our own sense of scale, its value and how we measure it. A selection of fine art prints, books and cards from the exhibition are available at ***Inky Leaves Publishing***. I am sure you will find something beautiful for yourself or your loved ones too. For myself I have ordered an A1 print of Blue Flame, I can't wait to see it on my walls!

If you click on below, you can experience a virtual exhibition of her **Leafescape.**



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JUNE 2022

PHYTOBYTES needs your input!

Whether you are student or staff,

please feel free to send any kind of news to Diego D. Bianchi - *dbianchi@tcd.ie*