



Institute of Biology of Ireland Activity Series, 2018/19

The Institute of Biology of Ireland, as part of the 2018/19 Activity Series, invites its members, families and friends to a free lecture at the Botanic Gardens, Dublin.

Title: The Evolution of the Earth's atmosphere as revealed by the plant fossil record

**Lecturer: Prof. Jennifer McElwain, Head of Botany Department,
Trinity College, Dublin**

Date and Time: Thursday, November 29th @ 8.00pm

Location: Lecture Theatre, National Botanic Gardens, Dublin

About the Lecture

Human carbon use during the next century will lead to atmospheric carbon dioxide concentrations ($p\text{CO}_2$) that have been unprecedented for the past 50-100+ million years according to fossil plant-based CO_2 estimates. The paleobotanical record of plants offers key insights into vegetation responses to past global change, including suitable analogs for Earth's climatic future. Past global warming events have resulted in transient poleward migration at rates that are equivalent to the lowest climate velocities required for current taxa to keep pace with climate change. Paleobiome reconstructions suggest that the current tundra biome is the biome most threatened by global warming. The common occurrence of paleoforests at high polar latitudes when $p\text{CO}_2$ was above 500 ppm suggests that the advance of woody shrub and tree taxa into tundra environments may be inevitable. Fossil pollen studies demonstrate the resilience of wet tropical forests to global change up to 700 ppm CO_2 , contrary to modelled predictions of the future. The paleobotanical record also demonstrates a high capacity for functional trait evolution as an additional strategy to migration and maintenance of a species' climate envelope in response to global change.

About the Lecturer



Jennifer (Jenny) McElwain holds the 1711 Chair of Botany at Trinity College Dublin's School of Natural Sciences. She is currently the Head of Botany within the School. Over the past 20 years her research and teaching have focused on the development and use of palaeobotanical methods (proxies) that use fossil plants to reconstruct the evolution of Earth's atmospheric composition and climate on multimillion year timescales. Her research team use both fossil plants and modern experimentation to investigate how fluctuations in atmospheric composition and climate have influenced plant evolution and ecology throughout Earth history. Her research programme has been successfully funded through both national and international grants and awards including Science Foundation Ireland, Irish Research Council, European Research Council, US National Science Foundation, National Geographic and Marie Curie. She was elected a Member of the Royal Irish Academy in June 2017 and awarded for

Excellence in EU research by the President of Ireland in 2012. She has published over 100 internationally peer reviewed publication and two editions of a well-regarded textbook *The Evolution of Plants*, Oxford University Press. She is a board member of the Mary Robinson Foundation for Climate Justice and a member of the Royal Irish Academy Committee on Climate Change and Environmental Science. Before joining TCD in 2017, she was an Associate Professor/Professor at University College Dublin for 11 years, a curator of fossil plants at the Field Museum of Natural History in Chicago (2000-2006) and post-doctoral researcher at the University of Sheffield, UK (2003-2006). She graduated from Trinity College Dublin with a BA Botany in 1993 and from Royal Holloway University of London with a PhD in 1997.

