Summary

Circadian clocks produce a biological measure of the time of day. My lab studies the molecular biology of how circadian regulation improves plant performance. Circadian regulation is crucial in plants because circadian regulation increases photosynthesis and productivity substantially (Dodd et al. Science 2005) and controls seasonality of flowering.

We are investigating the following:

1. How does the circadian clock control the photosynthesis?

   There are circadian rhythms of photosynthesis, but it is not known how the circadian clock regulates the photosynthetic apparatus.

2. How does the circadian clock co-ordinate cell signalling and membrane transport?

   Membrane systems are a crucial focus in plants for abiotic stress responses, photosynthesis, water fluxes and signal transduction.

3. How is the circadian clock tailored to physiologically-relevant cell types?

   A small number of cell types in plants have a disproportionately large impact on water use and stress tolerance. This includes the stomatal guard cell and root endodermis. We are investigating how circadian regulation in these cell types optimizes plant performance because the environment is characterized by 24 h cycles of water availability.

TOC1::LUCIFERASE bioluminescence

These images show circadian changes in the activity of the promoter of a circadian clock gene in Arabidopsis thaliana.

Full publication list: Link to Google Scholar
**Lab members**

Dr Paige Panter (Post-doc)

Fiona Belbin (PhD student)

David Cuitun Coronado (PhD student)

Calum Graham (PhD student)

Mathilda Gustavsson (PhD student)

Aline Yochikawa (PhD student)

Lauren Hibbert (MSc student)

**Lab alumni**

Dr Dora Cano-Ramirez

Dr Noriane Simon

Dr Kelly Atkins

Dr Jelena Kusakina (now a post-doc in Prof. Brendan Davies' lab at the University of Leeds)

Dr Zeenat Noordally (went on to be a post-doc in Prof. Andrew Millar's in Edinburgh and now at the University of Geneva)

Dr Yuanhua Zhang (CSC research fellow)

Dr Sarah Wetherill

Dr Anupama Chembath

Angela Fernandez-Lopez

Shogo Nagano (PhD student at Osaka Prefectural University)

Kester Cragg-Barber

**Biography**

2012 - present
Royal Society University Research Fellow and Proleptic Lecturer, University of Bristol

2008 - 2012
Royal Society University Research Fellow, Department of Biology, University of York

2007 - 2008
Broodbank Research Fellow, Department of Plant Sciences, University of Cambridge

2000 - 2007
Post-doctoral Research Associate, Department of Plant Sciences, University of Cambridge

**Activities / Findings**

**Selected publications**


**Memberships**

**Organisations**

- School of Biological Sciences

**Research groups**

- Plant and Agricultural Sciences

**Labs**

- Circadian Biology

**Recent publications**


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