

Doctoral Candidate (PhD student) in Systems Biology

Control of circadian period

The PhD student will be a member of the highly interdisciplinary research group, integrating experimental biological (supervised by Alex Webb in Plant Sciences) and system biology approaches (supervised by Jorge Goncalves in Engineering).

Description

Biological systems are dynamical in nature as molecular species evolve in time in response to internal or external regulations, perturbations or random fluctuations. We are interested in understanding the complex mechanisms inherent to biological systems from a dynamical perspective, typically captured with differential equations or stochastic processes from time-series data. The main objective of the PhD project is to investigate the feasibility to control the expression of different genes (phase, period and amplitude) using feedback control and how this results in the emergent properties of a circadian oscillator. The inputs are light and different metabolites (such as sucrose and nicotinamide) and the outputs are reporters of gene expression. We aim this way to fully understand how the circadian oscillator regulates phase and period of rhythms in a plant. The project connects the biological area of circadian clocks and theoretical fields of control systems and machine learning.

Your Profile:

- Strong mathematical background is a requirement! Hence, the student must hold a mathematics, engineering or physics degree.
- The ideal candidate would hold degrees in Control Systems, Mathematics, Theoretical Physics, or Theoretical Machine Learning.
- If not already covered in their background, students must also learn advanced mathematic courses from the *mathematics department* including analysis, functional analysis and linear algebra, and control systems courses from the engineering department. Biological knowledge is not essential, and the student will learn basic experimental biology and perform some of the experiments.
- We are seeking students that graduate in their top 20% undergraduate and Master's class rank (equivalent to a UK first class degree).
- Excellent working knowledge of English.
- Funding is available to students from the UK and other EU nations. Excellent candidates from non-EU nations are welcome to apply but they will have to obtain additional funding to take up the position.

Applications should contain the following documents:

- A detailed Curriculum vitae.
- A motivation letter, including a brief description of past research experience and future interests.
- Copies of diplomas.
- Please ask at least two references to email their confidential letters directly to Alex Webb (aarw2@cam.ac.uk) within two weeks of submitting the application.

Only complete applications will be considered.

Review of applicants will begin immediately and will continue until the position is filled.

For further information, please Alex Webb (aarw2@cam.ac.uk) or Jorge Goncalves (jmg77@cam.ac.uk).

The University of Cambridge is an equal opportunity employer. All applications will be treated in the strictest confidence.