Deadline for application: 30/01/2026

Catoni Lab
UNIVERSITY OF BIRMINGHAM

www.catonilab.com

Project title: Deciphering the (epi)genetic determinants of sex in monkey puzzle tree (*Araucaria Araucana).*

Supervisors: Dr Marco Catoni and Dr Estrella Luna-Diez

Project Description: Sex determination in gymnosperms remains one of the least understood aspects of plant developmental biology, particularly in long-lived, dioecious species such as *Araucaria araucana* (monkey puzzle tree). This iconic, endangered conifer native to South America exhibits separate male and female individuals, but the genetic and epigenetic mechanisms underlying sex differentiation remain entirely unknown. Taking advantage of the recent availability of *A. Araucana* reference genome, this PhD project will harness long-read sequencing to comprehensively investigate the genetic and epigenetic determinants of sex.

Objectives of this 3.5 years-funded PhD project:

- Reconstruct the genetic and epigenetic (DNA methylation) landscapes of male and female individuals by sequencing native genomic DNA.
- Determine molecular variation associated with sex determination, including structural variants and differential methylation patterns between sexes.
- Correlate genetic and epigenetic variation with transcriptional activity in male and female tissues, enabling identification of sex-specific gene expression and regulatory networks.
- Integrate genomic, epigenomic, and transcriptomic data to identify candidate genes, regulatory regions, and pathways involved in sex determination.

This research will provide the first comprehensive molecular framework for understanding sex determination in *A. araucana*, contributing both to fundamental plant biology and to the conservation of this endangered species. The project will also demonstrate the power of third-generation sequencing in resolving complex regulatory systems in non-model plant species. The ideal candidate will have a background in genomics, bioinformatics, molecular biology, or plant science, and a strong interest in evolutionary and developmental biology.

Funding note: This project is fully funded (tuition fees are covered in the studentship) and full time. Only **home students** are eligible to apply. For fee status information please check: https://www.birmingham.ac.uk/university/colleges/professional/external/admissions/fee-assessment-questionnaire

If interested, please apply to:
https://www.birmingham.ac.uk/study/postgraduate/subjects/biosciences-courses/biosciences-phd

Please indicate the project title and the supervisor (Dr Marco Catoni) in your application.
Contact m.catoni@bham.ac.uk for enquires.