Welcome to the Department of Genetics
Postgraduate Open Day

Speakers

- **Head of Department:** Prof. Steve Russell
- **Head Of Research:** Prof Cahir O'Kane
- **Postgraduate Administrator:** Sean Scinta
- **Student:** Dr Zeynep Öztürk

November 2nd 2022

Our Department

The Department of Genetics is host to around 50-65 postgraduate students at any given time. They work on a wide range of problems of modern biology, including population genetics and ecology, detailed analysis of the transcriptome, and cell and developmental biology.

The Department has its core in the Genetics Building on the Downing site, and also has members in nearby Research Institutes including the Gurdon Institute, Sainsbury Laboratory, and MRC Toxicology Unit. Our groups also collaborate with other local centres including:

- Department of Engineering
- Cavendish Laboratory (Department of Physics)
- Cambridge Institute for Medical Research

These interactions act as showcases for a varied offer of courses and seminars from the different institutes which challenge and develop students.

Our programmes

MPhil Genetics (Research Only)

12 months full-time

2 years part-time (case-by-case basis)

Applicants for this course should have achieved a UK **Good II.i Honours Degree**.

If your degree is not from the UK, please check **International Qualifications** to find the equivalent in your country.

University Minimum Academic Requirements link

PhD Genetics (Research Only)

3-4 years full-time

5-7 years part-time (case-by-case)

Applicants for this course should have achieved a UK **Good II.i Honours Degree**.

If your degree is not from the UK, please check **International Qualifications** to find the equivalent in your country.

University Minimum Academic Requirements link

New programmes 2023-24

The **MPhil in Biological Sciences** is offered by the Faculty of Biology as a full-time period of study and research, and introduces students to research skills and specialist knowledge in the Faculty's key research areas. While mainly research, it contains more formal classes in research training, and a shorter research project, than the MPhil by research. Many Genetics group leaders offer projects in this program.

The six "Pathways" offered are:
-Biomolecular Science
-Cell Science
-Crop Science
-Developmental Biology
-Infection Biology & Molecular Immunology
-Reproduction & Embryogenesis

Prospective students to apply directly to the pathway of their choice. Students choose a supervisor after acceptance, but we also encourage informal contact with potential supervisors before application.

If you have any questions please reach out to the MPhil Co-ordinator
anita.kovacs@admin.cam.ac.uk

MPhil (Genetics) Course Outcomes

Most MPhil in Genetics candidates start in October, to take advantage of Departmental and University induction programmes and funding opportunities, but admission in January or April is also possible.

The examination for the degree of Master of Philosophy consists of a thesis, of not more than 20,000 words in length, exclusive of tables, footnotes, bibliography, and appendices. The assessment also includes an oral examination on the thesis and on the general field of knowledge within which it falls.

Please note: part-time study may not always be viable and will be considered on a case-by-case basis, so please discuss this option with your proposed supervisor before making an application for this mode of study.

Learning Outcomes

By the end of the programme, students will have:

- a comprehensive understanding of techniques, and a thorough knowledge of the literature applicable to their own research;
- demonstrated originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field;
- shown abilities in the critical evaluation of current research and research techniques and methodologies; and
- demonstrated some self-direction and originality in tackling and solving problems, and acted autonomously in the planning and implementation of research.

PhD Course Outcomes

PhD students in the Department will undertake 3-4 years of research under the supervision of one or more group leaders, where they will develop an original research question and address this through laboratory or computer-based research.

Students will undertake specific training in their research area, as well as more generic skills training. Supervising undergraduate students is often a rewarding part of the research student experience, and opportunities through the Department's teaching portfolio and the College supervision system are widely available. Students are expected to submit their thesis by the end of their fourth year.

Towards the end of their first year of study, students are required to complete a satisfactory first-year report and viva.

Most PhD candidates taking this option starting in October, to take advantage of Departmental and University induction programmes and funding opportunities, but admission in January or April is also possible.

Please note: part-time study may not always be viable and will be considered on a case-by-case basis, so please discuss this option with your proposed supervisor before making an application for this mode of study.

Learning Outcomes:

- a comprehensive understanding of techniques, and a thorough knowledge of the literature applicable to their own research;
- demonstrated originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field;
- shown abilities in the critical evaluation of current research and research techniques and methodologies;
- demonstrated self-direction and originality in tackling and solving problems, and acted autonomously in the planning and implementation of research;
- independence in designing and conducting a substantial body of original research, and preparing that data in a format suitable for publication in peer-reviewed journals.

Application Requirements

1. Identify and make contact with a possible Supervisor(s)

Please contact prospective supervisor(s) to discuss potential projects before a formal application. You must identify a potential supervisor (or supervisors) in the Department before applying. Supervisors and their research areas are listed on the Department of Genetics website.

2. You'll need to get a few things ready before you apply.

- **Two academic references**
- **Transcript**
- **CV/resume**
- **Evidence of competence in English**
  *If required - you can check using our **tool***
- **Proposed Supervisor (Mandatory)**
- **Statement of Interest (Mandatory)**
- **Research experience (Mandatory)**
- **Research Proposal (Optional, depends on funder)**

Language Requirement

IELTS (Academic)

Element	Score
Listening	7.0
Writing	7.0
Reading	6.5
Speaking	7.0
Total	7.0

TOEFL Internet Score

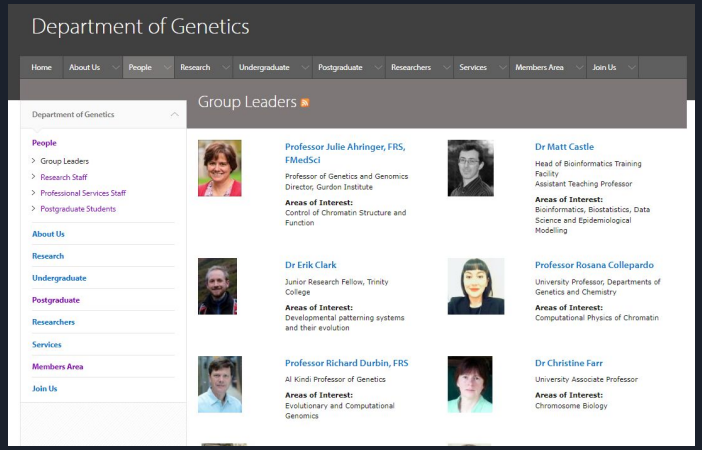
Element	Score
Listening	25
Writing	25
Reading	25
Speaking	25
Total	100

Field in online form	Character limit (including spaces)
Research Summary (Research)*	1,500
Research Experience (Research)	1,500
Career Goals (Other Information)	1,000
Additional information to support application (Other Information)	1,000
Funding opportunities identified (Funding Application)	1,000
Gates Cambridge Personal Statement (Funding Application)	3,000
Required adjustments (Adjustments)	1,000

How to Find a Supervisor

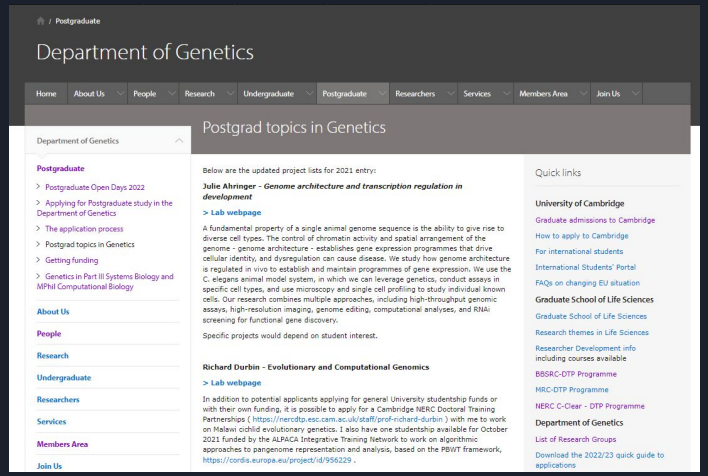
Prospective students must identify a potential supervisor (or supervisors) in the Department before applying. Please contact prospective supervisors to discuss potential projects before a formal application. In your email you can attach both a CV with details of the degrees you have taken and the marks you have obtained, and a brief statement of interest (1-2 pages max). There is no need to attach references or transcripts. Please be aware that our PhD supervisors receive large numbers of enquiries, and that they therefore cannot give detailed feedback on your proposal.

Department Group Leaders Page



Group Leaders | Department of Genetics (cam.ac.uk)

Postgraduate Topics in Genetics Page



Postgrad topics in Genetics | Department of Genetics (cam.ac.uk)

Funding Opportunities

If you are seeking funding as well as a place in the Department you must apply much earlier than if you are self funded or applying externally for scholarships, in some cases as much as a year in advance.

The University of Cambridge Graduate Prospectus web pages cover the subjects of funding and costs in detail. They also provide links to the relevant Research Councils for UK applicants, and to the Cambridge Trusts for overseas applicants. We also encourage students to explore the **Postgraduate Student Funding Search.** The School of Biological Sciences website also has information on funds and Fellowships specifically in biology and medicine.

There are two major funding deadlines, **GATES US (Application deadline Wednesday 12 October 2022)** and the **University Funding competition (Application deadline* Dependent on your course – bur for our department it is 5 January 2023)**

The major internal sources of funding are: Cambridge Trust, Gates Cambridge Trust, Harding Distinguished Postgraduate Scholars Programme, Research Councils and collectively College and departmental schemes. Please use the student funding link to help with your search, **https://www.student-funding.cam.ac.uk/ .**

Helpful funding links

- PhD in Genetics | Postgraduate Admissions (cam.ac.uk)
- Funding | Postgraduate Admissions (cam.ac.uk)
- Welcome - Postgraduate Funding Search (cam.ac.uk)
- Cambridge University Scholarship Deadlines | Gates Cambridge
- Scholarships (cambridgetrust.org)

Other Funding Opportunities

UNIVERSITY OF CAMBRIDGE · Babraham Institute · NIAB · wellcome sanger institute · UKRI Biotechnology and Biological Sciences Research Council

Targeted Project / AY 2023 -2024

Epigenetic inheritance and the regulation of mammalian developmental programmes

Supervisor: Prof Anne Ferguson-Smith (afsmith@gen.cam.ac.uk)

Department/Institute: Genetics

Co-supervisor: Dr Carol Edwards (Genetics)

Research area: Epigenetic inheritance in development

Project outline:

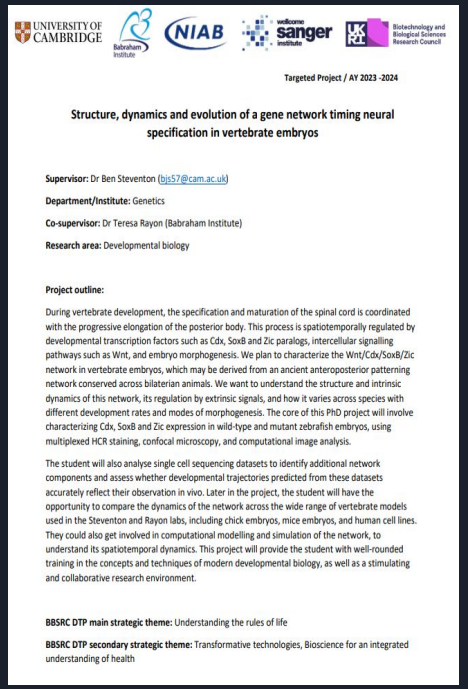
We study epigenetic inheritance and the epigenetic control of genome function including using genomic imprinting as a model system to decipher epigenetic principles and concepts in mammalian development.

In collaboration with the student, we can develop a student-centred tailored project that fulfil the interests and aspirations of the student in addition to addressing our programme aims. Our group is multi disciplinary and our research takes in vivo approaches (including CRISPR), alongside and stem cell and bioinformatic 'omics' and computational technologies and the student will have therefore have access to a wide repertoire of research opportunities in mammalian developmental genetics and epigenetics.

BBSRC DTP main strategic theme: Understanding the rules of life

BBSRC DTP secondary strategic theme: Bioscience for an integrated understanding of health

BBSRC Ferguson-Smith



UNIVERSITY OF CAMBRIDGE · Babraham Institute · NIAB · wellcome sanger institute · UKRI Biotechnology and Biological Sciences Research Council

Targeted Project / AY 2023 -2024

Structure, dynamics and evolution of a gene network timing neural specification in vertebrate embryos

Supervisor: Dr Ben Steventon (bjs57@cam.ac.uk)

Department/Institute: Genetics

Co-supervisor: Dr Teresa Rayon (Babraham Institute)

Research area: Developmental biology

Project outline:

During vertebrate development, the specification and maturation of the spinal cord is coordinated with the progressive elongation of the posterior body. This process is spatiotemporally regulated by developmental transcription factors such as Cdx, SoxB and Zic paralogs, intercellular signalling pathways such as Wnt, and embryo morphogenesis. We plan to characterize the Wnt/Cdx/SoxB/Zic network in vertebrate embryos, which may be derived from an ancient anteroposterior patterning network conserved across bilaterian animals. We want to understand the structure and intrinsic dynamics of this network, its regulation by extrinsic signals, and how it varies across species with different development rates and modes of morphogenesis. The core of this PhD project will involve characterizing Cdx, SoxB and Zic expression in wild-type and mutant zebrafish embryos, using multiplexed HCR staining, confocal microscopy, and computational image analysis.

The student will also analyse single cell sequencing datasets to identify additional network components and assess whether developmental trajectories predicted from these datasets accurately reflect their observation in vivo. Later in the project, the student will have the opportunity to compare the dynamics of the network across the wide range of vertebrate models used in the Steventon and Rayon labs, including chick embryos, mice embryos, and human cell lines. They could also get involved in computational modelling and simulation of the network, to understand its spatiotemporal dynamics. This project will provide the student with well-rounded training in the concepts and techniques of modern developmental biology, as well as a stimulating and collaborative research environment.

BBSRC DTP main strategic theme: Understanding the rules of life

BBSRC DTP secondary strategic theme: Transformative technologies, Bioscience for an integrated understanding of health

BBSRC Steventon

Alexander Crummell Master's & PhD Scholarships

These are for UK-based students from disadvantaged or under-represented backgrounds. All fees and maintenance costs are covered. **For further details, please see The Alexander Crummell Scholarships | Queens' College (cam.ac.uk) or contact graduate.office@queens.cam.ac.uk**

BBSRC-funded PhD studentships*

This doctoral training program (DTP) covers research areas in the remit and strategic priority areas of BBSRC, in several institutions including the Genetics Department. Funded 4-year PhD projects are available in: Agriculture and Food Security, Industrial Biotechnology and Bioenergy, Bioscience for Health, World-Class Underpinning Bioscience. **Further information and application details: http://bbsrcdtp.lifesci.cam.ac.uk/**

Other Funding Opportunities

MRC-funded PhD studentships*

This DTP is a collaboration between the University of Cambridge and the Babraham Institute. PhD studentships are available in the areas of Population and Systems Medicine, Infection and Immunity, Molecular and Cellular Science, Neuroscience and Mental Health. **Further information and application details are available at https://mrcdtp.medschl.cam.ac.uk**

NERC funded PhD studentships*

The Cambridge Climate Life and Earth (C-CLEAR) NERC Doctoral Training Partnership provides PhD training across the NERC science portfolio with the Department of Genetics contributing to training in the Biology and Conservation research theme.
There are two projects available for the 2023-24 academic year. Please find more information on the links below.

- BC404: Human population history in real landscapes (Lead Supervisor: Aylwyn Scally, Genetics)
- BC425: Genomics of adaptive speciation in Lake Malawi cichlid fishes (Lead Supervisor: Richard Durbin, Genetics)

Mastercard Foundation Masters studentships

For African students, for work in the broad areas of climate resilience and sustainable development. **Further information at: https://www.postgraduate.study.cam.ac.uk/funding-overview/mastercard-foundation-scholars-program-university-cambridge**

* These DTPs are mainly for UK-based applicants but there is some competitively awarded funding for overseas applicants

BC425: Genomics of adaptive speciation in Lake Malawi cichlid fishes (Lead Supervisor: Richard Durbin, Genetics)

Lead Supervisor: Richard Durbin, Genetics

Co-Supervisors: Emilia Santos, Zoology

Brief summary:
The student will use large scale genome sequencing and evolutionary genetics to identify and study genes involved in adaptation and speciation in an iconic evolutionary radiation.

Importance of the area of research concerned:
The diversity of life is a consequence of the processes of speciation, which generates new species, and adaptation, which leads to divergence into new forms. Both these processes take place through an interplay between ecology and genetics. Understanding them is central to our understanding of biodiversity. The ~500 closely related species of cichlid fishes in Lake Malawi form perhaps the most dramatic recent evolutionary radiation in vertebrates, providing many outstanding examples of speciation and adaptation, with extensive parallelism to allow dissection of key processes. By studying the genome sequences of population samples from multiple species at different degrees of divergence, and correlating them with adaptive traits and other properties, we can gain insights into adaptive speciation that can be tested in an experimental setting. Recently we developed methods to extract quantitative information from 3-D X-ray scans of fish skulls. This study aims to identify genetic determinants of jaw and head shape and combine them with evolutionary genetics analyses to identify genes involved in the process of speciation in an iconic evolutionary system.

Project summary :
This project will study whole genome sequence data from population samples of multiple cichlid species, in conjunction with quantitative data on jaw and head shape extracted from micro-CT scans of the same fish. From initial studies on over 2000 sequences, we are starting to understand the processes and genes involved in this dramatic radiation. Genome wide association studies (GWAS) on micro-CT data from a first set of ~120 fish have already suggested interesting candidate genes. The student will extend these studies, and correlate them to evolutionary genetic analyses so as to identify loci selected during speciation. It is expected there will be an opportunity for field work to collect new samples. Functional consequences will be tested in collaboration with the Santos group in laboratory crosses and experiments.

BC404: Human population history in real landscapes (Lead Supervisor: Aylwyn Scally, Genetics)

Lead Supervisor: Aylwyn Scally, Genetics

Co-Supervisor: Charlotte Houldcroft, Genetics

Brief summary:
Investigating the demography, genetics and life histories of ancient humans using spatial population genetic simulation methods and machine learning.

Importance of the area of research concerned:
Population genetic studies typically consider abstract populations with no spatial aspect, but real populations and species evolve on landscapes in two (or even three) dimensions. This adds a considerable degree of complexity, but the effects of spatial dynamics on demography and evolution can now be explored using powerful new computational simulation methods. Furthermore, a growing quantity of archaeogenetic evidence is available for ancient and historical human populations, particularly from northern, western and central Europe. Together, these developments provide an opportunity to investigate demographic, social and even cultural factors in ancient populations in these regions. Moreover, the methods and approaches developed will have broader application to other species as similar evidence becomes available for them.

Project summary :
The project will develop computational simulations of population genomic evolution in spatial environments and apply cutting-edge inference methods to integrate genetic, geospatial and archaeological data. It will address questions such as: - Given present-day and ancient genetic data, with what resolution can we infer spatial aspects of past populations, such as their distributions of ancestry and the movements of individuals and groups? - To what extent can we use archaeogenetic evidence to infer social and cultural factors such as population stratification, sex biases in mating and movement, past mortality from epidemics, and life expectancy or reproductive behaviour? These approaches will be applied to archeogenetic and paleoenvironmental datasets, focusing in particular on neolithic and iron age Europe.

Helpful Links & Contacts

- Postgraduate Admissions pg.admissions@admin.cam.ac.uk
- International Student Office international.students@admin.cam.ac.uk
- International Student Office Visa Guidance international.students@admin.cam.ac.uk
- Cambridge Students Page, https://www.cambridgestudents.cam.ac.uk/
- Contact Us (cambridgetrust.org) Cambridge.Trust@admin.cam.ac.uk
- Cambridge life | Cambridge students https://www.cambridgestudents.cam.ac.uk/cambridge-life
- Search - Postgraduate Funding Search (cam.ac.uk) https://www.student-funding.cam.ac.uk/

Instagram

YouTube

Twitter

Linktr.ee