INFORMATION for CANDIDATES

This document is designed to give you as much information as possible about the role you have applied for.

Post:	**Postdoctoral Research Associate**
School/Department:	**Biological Sciences / Institute of Structural & Molecular Biology**
Vacancy Ref. No:	**3014646**
Closing date:	**22 August 2011**

Job description:

Funding body:	BBSRC
Hours:	Full-time (35hrs/week)
Start date:	01 September 2011 or as soon thereafter
Duration:	Fixed term until 30 April 2013
Supervisor:	Dr Karen Halliday
Informal enquiries:	Valerie.clark@ed.ac.uk

Background:

We are seeking a PDRA to join our ROBuST project that aims to understand the impact of temperature on molecular signalling in the model species Arabidopsis.

The Project

ROBuST is a collaborative, BBSRC-funded project, with participating groups at the Universities of Edinburgh, York, Liverpool and Warwick. The project will combine experimental and theoretical approaches to provide the first detailed understanding of temperature responses across any complex biological signalling network. Working in close association with the Centre for Systems Biology at Edinburgh (CSBE) cutting-edge data and mathematical models will be integrated into large-scale informatics infrastructure. These tools will be used to understand the impact of temperature on dynamic signalling in response to light, cold and the circadian clock.

Description

Our previous studies have combined genetics, molecular biology and in vivo imaging to understand the intricacies of phytochrome and circadian clock signal transduction in Arabidopsis thaliana. A key feature of the circadian clock is that it is quite resistant to the effects of temperature. We are now beginning to understand the molecular basis for this biological temperature compensation (e.g. Gould et al., Plant Cell. 2006 5:1177-87). Our work has also demonstrated that collective action of the light receptors provides another type of biological buffer that ensures events, such as the flowering time, are not affected by daily fluctuations in temperature (e.g. Halliday et al., Plant J. 2003 5:875-85).

To derive an understanding of how temperature influences molecular signalling, in this project we are focusing on the interconnected pathways of the light, the circadian clock and cold acclimation. Our aims are to establish the features of this network that: 1. buffer the effects of temperature, or 2. trigger responses to temperature change. To do this we are combining mathematical, informatics and experimental approaches to construct dynamic network models. Our initial models have been developed by modifying our existing mathematical models of the Arabidopsis clock (e.g. Locke et al., Mol. Syst. Biol. 2006 2:59). Our next goal is to develop extended clock models that are fully constrained by temperature data.

A main component of the experimental programme has been to generate high quality data on temperature regulation of molecular steps through the network. The parameter values derived from this data will be used to train our existing models such that they more accurately reflect the system behaviour across temperatures. This scale of project has required the large scale production of Arabidopsis wild type and mutant lines (for the ~50 genes in our network) expressing reporter constructs for our network genes. This work has mainly been conducted by our project technicians based are Edinburgh, Liverpool and York.

Your work will include large-scale robotised time-series qRT-PCR, the preparation of material for Nano-String analysis. You will be required to conduct analysis of proteins. This work will include western blot analysis, assessment of protein modifications, *in vitro* binding assays such as yeast-2-hybrid and yeast-1-hybrid. You will be expected to design and conduct experiments for physiological analysis and time-series bioluminescence assays (e.g. p:LUC). This work will involve growing and analysing seedlings under close-controlled conditions and harvesting samples over circadian time. Regular exchange with informaticians and mathematicians will be necessary to for you to keep up-to-date with ROBuST infrastructure and model development. You will need to be fully conversant with the software required for time-series rhythm analysis. You will also need to become familiar with our project data repository (Biodare) and database, where all project data is deposited and will be expected to communicate with other project members via email and the WIKI.

For your laboratory work you will have assistance from two technicians who also provide support for other PDRA's in the team. In consultation with the other PDRAs, you will be responsible for directing and supervising the technicians and students in the lab. You will ensure that your work is accurate and meets *internal deadlines*. This is important as aspects of the project are coordinated across sites time lines are important. Working with the theoreticians and experimental PDRAs, you will help coordinate the experimental and theoretical work over our four sites.

As this is an integrative project, you will provide scientific input to the informaticians based at Edinburgh and the modellers based at Warwick. This will assist with experimental data integration and model development. A dialogue with the informaticians and modellers is essential and must be exercised on a daily basis.

The project is a team effort involving the Halliday research group, and the Millar, Gilmore and Williams groups at the Edinburgh site, the Penfield and Graham groups at York, the Hall and White groups at Liverpool, and the Rand and Finkenstadt groups at Warwick. At Edinburgh the ROBuST team work in close association with CSBE. The modelling will be closely coordinated with experimental research: it is essential that you work closely with the modellers in order to design experiments that are maximally informative and feasible. You will work directly with theoreticians and the central facilities of CSBE, and have regular reporting contact with Dr Halliday and the project coordinator and the ROBuST Management team. Cross-centre communication will be achieved by regular meetings (phone, on-line and face to face) between groups at our different sites. We will also hold yearly training meetings that will involve consultation with our Advisory board, which comprises experts from academia and industry.

Main responsibilities:

As an experimental PDRA operating under the direction of the project leader:

I. Main duties: lab work

You will be required to work in a meticulous manner and execute a range of molecular and phenotyping assays to a high standard. These include the following:

A) Analyse expressed or native protein levels, protein modification, protein interactions and antibody production.

B) Conduct and oversee large scale quantitative real time PCR time course experiments using our high throughput LightCycler® 480 System and prepare samples for NanoString assays. B) Generate constructs for expression in transient assays, cell lines or transformation *in planta*.

C) Conduct photo-physiological analysis of a range of genotypes across temperatures.

D) Perform time-series *luciferase* assays and become familiar with the software used to recognise rhythmic outputs.

E) Identify and evaluate relevant new technologies.

F) Time-management: You will be expected to plan experiments and other activities ahead of time, set clear goals and meet task completion deadlines.

G) Work closely with the project coordinator to ensure project goals remain focussed.

H) Assist with the supervision of students in the lab and work with the lab technicians to ensure that lab stocks and facilities are maintained.

II. Literature, reporting, manuscript and event preparation

A) It is expected that you will keep up to date with the relevant literature and have an understanding of major scientific developments in the broader field.

B) Prepare reports to document project activities, reviews and research manuscripts for submission to peer-reviewed journals.

C) Deliver poster and oral presentations in project meetings, at workshops and conferences.

D) Assist with organising yearly training workshops with the project coordinator and other PDRAs.

III. Information transfer

A) Participate in structured and documented face-to-face and video-link meetings with other project members.

B) You will need to achieve a level of competence in understanding the basis of a range of modelling approaches on the project.

C) Work alongside theoreticians to facilitate information exchange and knowledge transfer to facilitate coordination of wet and dry work and model development.

IV. Data storage, communication and lab maintenance

A) You will be required to utilise the project data repository and wiki during your day to day activities.

B) Ensure that project materials and resources are acquired, stored and distributed by the technician assigned to this task.

Person specification:

Essential

1. A PhD in molecular biology
2. Research experience and quality publications in plant molecular biology or related areas.
3. Understanding of light and/or circadian biology
4. Work meticulously and have experience with several of the following: Arabidopsis genetics, growth and physiological analysis of Arabidopsis thaliana, genetic crossing, quantitative real time PCR, luciferase imaging, protein analysis using western blotting, *in vitro* protein binding assays (eg yeast-two-hybrid) biochemical assays, and standard molecular procedures e.g. RNA extraction, cDNA synthesis, gel electrophoresis.
5. Must be highly organised, even tempered and used to dealing with day-to-day issues in a professional manner.
6. Demonstrable ability to manage time effectively, plan and conduct sub-projects within time limits.
7. Accuracy and precision at work is essential.
8. Enthusiasm for combining theoretical and experimental work.
9. Proven ability in team working and supervision.
10. Excellent communication and writing skills are essential.

Desirable

1. Previous experience of theoretical work will be an advantage.
2. Ambitions to pursue fellowship routes.

Research Facilities:

You will work within the Halliday lab which is based within the Daniel Rutherford Building on the Edinburgh Kings Buildings Campus. You will have strong links with the Centre for Systems Biology at Edinburgh (CSBE), which operates within the C.H. Waddington Building that can be accessed directly from the Rutherford building.

Salary:

The role is grade **UE07** and attracts an annual salary of **£29,972** to **£35,788** for full-time hours. Salary is paid monthly by direct transfer to your Bank or Building Society account, normally on the 28th of each month. Salaries for part-time staff are calculated on the full-time scales, pro-rata to the Standard Working Week.

Please note that the starting salary for this post will be no higher than £31,798 p.a. due to budgetary constraints on available funding for the project.

We anticipate interviews will be held 1 – 2 weeks after the closing date. If you have not been invited for interview by this date, you have not been successful.

UKBA Certificate of Sponsorship:

Should you require a visa to undertake paid employment in the UK you will be required to fulfil the minimum points criteria to be granted a Certificate of Sponsorship and Tier 2 visa. As appropriate, at the time an offer of appointment is made to you, you will be asked to demonstrate that you fulfil the criteria in respect of financial maintenance and competency in English.

General Information

The University of Edinburgh www.ed.ac.uk

The University of Edinburgh has been instrumental in shaping history for over 400 years and is one of the largest universities in the UK. It is Scotland's premier research university and was graded among the top British Universities in the most recent national Research Assessment Exercise. It has over 7000 staff and a student population of some 20000. The university consists of twenty-one academic Schools organised into three Colleges; Science and Engineering; Medicine and Veterinary Medicine; and Humanities and Social Science.

The College of Science and Engineering www.scieng.ed.ac.uk

The College of Science and Engineering is one of the largest groupings of its kind in the United Kingdom with approximately 5000 undergraduate students and 1000 postgraduate students, and 1400 staff of whom about 950 are teaching and research staff. It comprises Schools of Biological Sciences; Chemistry; Engineering and Electronics; Geosciences; Informatics; Mathematics; and Physics. In the 2001 RAE 94% of its academic and research staff were in units of assessment rated 5 or 5*. Most of the College is located at the Kings Buildings site, approximately three miles south of the city centre.

The School of Biological Sciences www.biology.ed.ac.uk

The School of Biological Sciences (SBS) is located at the King's Buildings campus. It includes about 110 academic staff and independently-funded senior research fellows, around 200 research assistants, most of whom are postdoctoral, 170 technicians and more than 200 PhD students. Research grant expenditure is currently about £17M per year. The School comprises six research-focused institutes with a strong inter-disciplinary remit: Structural and Molecular Biology, Cell Biology, including the Wellcome Trust Centre for Cell Biology, Stem Cell Research, Immunology and Infection Research, evolutionary Biology, and Molecular Plant Science. Research of the highest international standard is conducted over a wide range of pure and applied biological science.

Postgraduate studies are co-ordinated by a Graduate School of Biology and the School also is a partner in the Wellcome Trust 4year PhD programme, together with the graduate school of Medicine and Veterinary Medicine.

The Centre for Systems Biology at Edinburgh www.csbe.bio.ed.ac.uk

The Centre for Systems Biology at Edinburgh (CSBE) brings together two of Edinburgh University's great strengths, world-class Informatics and world-class Biology, as part of the University's vision to

integrate the physical with the life sciences. CSBE is one of 6 UK "Centres for Integrative Systems Biology" and the only one in Scotland. It is initially supported by an £18M investment from BBSRC, EPSRC, and the University of Edinburgh. CSE aims to integrate biological data and mathematical models into large-scale informatics infrastructure and apply novel tools to understand a range of dynamic biological processes. The biological pilot projects include RNA metabolism in yeast, interferon signalling in human macrophages and the plant circadian clock; theoretical projects include process algebras and graphical notations for systems biology modelling, machine learning methods for network inference, an integrated informatics infrastructure for model development and mathematical tools for high-dimensional model analysis.

CSBE draws expertise from 11 internationally-leading Systems Biology research groups in the Schools of Biological Sciences (Beggs, Tollervey, Millar), Informatics (Goryanin, Hillston, Plotkin), Engineering (Walton) and BioMedical Sciences (Ghazal), together with staff at the Mathematics Department of Heriot-Watt University (Painter, Sherratt) and at Biomathematics and Statistics Scotland (BioSS; Husemeier). An additional Chair of Systems Biology, Michael Tyers (formerly of the University of Toronto), will strongly interact with CSBE. These groups have numerous additional links in the areas of synthetic biology, biological chemistry and mass spectroscopy, amongst others.

Life Sciences in the City of Edinburgh

Edinburgh and its surroundings provide one of the largest groupings of bioscience researchers in the UK. Local research partners include Heriot-Watt University the SEERA-funded Biomathematics and Statistics Scotland (located on the Kings Buildings campus), and the BBSRC Roslin Institute. The Scottish Agricultural College is co-located on King's Buildings campus and we have good links with other Associated Institutions in Edinburgh such as the Royal Botanic Garden Edinburgh. Links to knowledge transfer organisations are strong with a bioscience incubator on the King's Buildings campus and the Edinburgh Science Park based just outside the city, including the Edinburgh Technopole.

As a place to live the City of Edinburgh has all the advantages of a European capital city with a distinctive historical and architectural heritage and a vibrant cultural life including the world's largest arts festival. It is also within easy access of some of the most beautiful country and highland scenery to be found anywhere.

Application procedure

We encourage all applicants to apply online at www.jobs.ed.ac.uk. The application process is quick and easy to follow, and you will receive email confirmation of safe receipt of your application. The online system allows you to submit a C.V.

If you do not have access to a computer, you can call our recruitment line on 0131 650 2511 for an application pack. This will be posted out to you for you to complete and return.

To complete the application process, you need to complete the (i) Application Form, (ii) Additional Personal Information Form, (iii) Equality and Diversity Monitoring Form, (iv) Rehabilitation of Offenders Form, (v) C.C. with a full list of publications, software, patents, and other research outputs, (vi) a personal statement outlining past influences, career goals, and what you would hope to achieve in this post (up to one page), and (vii) the names and contact details (including email) of three referees. Please return the Application form and all enclosure (except the equal opportunities form) to School Office, Darwin Buildings, the King's Buildings, Mayfield Road, Edinburgh, EH9 3JR by the closing date of **22 August 2011**. Return the equal opportunities form in the separate prepaid envelope. We cannot guarantee to consider late applications.

Please quote reference no: **3014646**
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The University reserves the right to vary the candidate information of make no appointment at all. Neither in part, nor in whole does this information for part of any contract between the University and any individual.