

Job description

Post title and post number	Experimental Officer in Bioinformatics and Metabolomics - 55192
Organisation advertising Description	School of Biosciences

Job summary

Phenome Centre-Birmingham is a new major centre for providing national capability in state-of-the-art metabolic phenotyping applied to stratified medicine. The post holder will contribute significantly to the day-to-day operation of the Phenome Centre-Birmingham (PC-B) within the University of Birmingham, in particular by implementing an automated data processing pipeline, experimental design, and processing and statistical analysis of large scale MS and/or NMR based metabolomics datasets. In addition the post holder will collaborate with researchers within and external to the university (academic, industry, scientific instrument manufacturers), provide training and support in bioinformatics, and undertake independent research.

Main duties

- To develop and conduct computational and statistical analyses of metabolomics datasets within the Phenome Centre-Birmingham, in particular of MS and/or NMR datasets analysed by both univariate and multivariate techniques.
- Implement an automated analysis pipeline for MS and/or NMR based metabolomics datasets.
- To undertake independent research in computational metabolomics, to develop the workflows for managing and analysing metabolomics datasets, for example using Galaxy software.
- To develop and maintain the computer hardware and software associated with the metabolomics laboratory.
- To train and assist postdoctoral researchers and PhD students in bioinformatics analyses of metabolomics datasets.
- To contribute to writing bids for research funding.
- Apply knowledge in a way which develops new intellectual understanding.
- Disseminate research findings for publication, research seminars, etc.
- Undertake management/administration arising from research
- Collect research data; this may be through a variety of research methods,

- such as scientific experimentation, literature reviews, and research interviews
- Present research outputs, including drafting academic publications or parts thereof, for example at seminars and as posters
 - Provide guidance, as required, to support staff and any students who may be assisting with the research
 - Deal with problems that may affect the achievement of research objectives and deadlines

Skills and Experience

- PhD or equivalent experience in Bioinformatics, Biostatistics, Chemometrics or Computational Biology (all with metabolomics or related specialism).
- Experience in the analysis of MS and/or NMR metabolomics datasets.
- Experience in statistical analyses, including multivariate and univariate methods.
- Experience in computer programming (e.g. python and R).
- Experience in workflows, e.g. Galaxy.
- Experience in managing multiple projects simultaneously.
- Good communication and interpersonal skills.
- A high level of accuracy and attention to detail.
- Ability to work on own initiative, manage time effectively, progress tasks concurrently and work to deadlines.
- Detailed knowledge of office safety
- Ability to communicate complex information clearly
- Fluency in relevant models, techniques or methods and ability to contribute to developing new ones
- Ability to assess resource requirements and use resources effectively
- Understanding of and ability to contribute to broader management/administration processes

Equal Opportunities

The University of Birmingham is an equal opportunities employer and we welcome applications from currently under-represented groups.

The School of Biosciences holds a Bronze Athena SWAN award. We welcome flexible working to suit family or other commitments. The University has on-campus childcare facilities.

The Environment

The University of Birmingham

The University of Birmingham has a distinguished academic reputation. It is a member of the Russell Group and belongs to the international network Universitas 21. The University was founded in 1900 at the initiative of local citizens and is now one of the largest in the UK offering degrees across a wide range of disciplines from Education to Medicine and from Engineering to Law. It is a major international centre of academic excellence and was ranked 82nd in this year's QS World University Rankings, cementing our position in the top 100 universities globally and placing us as 15th amongst UK universities. Eleven former members of the University have been Nobel Prize winners.

The University has a turnover of over £400 million per annum and is currently undergoing an extensive capital programme. This positive financial position is almost unique in the UK Higher Education sector and provides a firm foundation for further investment. One of the University's greatest assets is its Edgbaston campus. It offers its community of over 27,000 students and 6,000 staff an attractive environment in which to study and work. It is situated only two miles from the centre of a major European city and yet is set amongst green and leafy parkland which is largely pedestrianised, and provides a beautiful and pleasant backdrop for imposing Victorian redbrick buildings as well as some striking modern architecture.

The University of Birmingham is an Equal Opportunities employer. It aims to ensure that no job applicant or employee will receive less favourable treatment on the grounds of race, colour, nationality, ethnic or national origins, sex or marital status: this policy will include disabled persons who have the necessary attributes for the post. The University will operate selection and promotion criteria and procedures that are designed to ensure that individuals are selected, promoted and treated on the basis of their relevant aptitudes, skills and abilities.

Metabolomics Research at the University of Birmingham

The Metabolomics Initiative at the University of Birmingham began in 2003 and now encompasses several Schools including Biosciences, Medicine, Mathematics and Computer Science. Our metabolomics research spans the development of analytical and informatic methods as well as their application to wide ranging and numerous projects in the Life Sciences to provide significant impact for change in human health and the environmental sciences. These include studies in mammals, fish, invertebrate organisms, microbes and plants, with a particular emphasis in both **clinical metabolomics** and environmental metabolomics. The research is driven by internationally-recognised academic staff (Viant and Dunn) supported by our current and highly active research program which involves ca. 50 principal investigators, postdoctoral researchers and PhD students. Research and translation is performed in world-class bioanalytical facilities including the national NERC Biomolecular Analysis Facility (NBAF) for environmental metabolomics, The Henry Wellcome Building for Biomolecular NMR Spectroscopy and the Centre for Computational

Biology (CCB) (further details below). To further strengthen our capacity and capabilities in clinical metabolomics, we were funded £8 million by a consortium (including the MRC) in 2015 to establish the Phenome Centre Birmingham. This research centre includes eleven UPLC-MS instruments.

Further details on the **University's Metabolomics Research** can be found at:

<http://www.birmingham.ac.uk/research/activity/metabolomics/index.aspx>

Clinical Metabolomics Research in Birmingham

Clinical metabolomics research in Birmingham integrates the University of Birmingham, the University Hospitals Birmingham NHS Foundation Trust and Birmingham Health Partners to provide cutting-edge research translatable to provide patient benefits. The importance of translation is highlighted by the soon-to-open Institute of Translational Medicine which will provide the bridge between primary research and translation in to healthcare systems. Research covers a broad area of disciplines including endocrinology, healthy ageing, inflammatory and immunological diseases, cancer, cardiology and liver diseases. Currently more than 30 principal investigators, postdoctoral researchers and PhD students apply metabolomics to clinical research. A significant focus of this research, and the focus of Phenome Centre Birmingham, is stratified medicine.

Further details of examples of specific centres can be found at:

<http://www.birminghamhealthpartners.co.uk/>

<http://www.birmingham.ac.uk/research/activity/mds/centres/cedam/index.aspx>

<http://www.srmrc.nihr.ac.uk/>

<http://www.birmingham.ac.uk/generic/mrc-aruk/home.aspx>

Phenome Centre Birmingham

The £8M Phenome Centre Birmingham (PCB) has been funded as part of the Stratified Medicine Innovation and Technology Facility at the University of Birmingham and Birmingham Health Partners. The Phenome Centre Birmingham has the goal to enhance metabolic research for stratified medicine in Birmingham and the UK through the provision of increased capacity and capabilities. The centre operates with a range of instruments (eleven UPLC-MS systems and two NMR systems) applied to study human metabolism, primarily in human biofluids but also in mammalian cells and tissues. The PCB offers assays to study samples in a non-targeted approach (applying reversed phase UPLC-MS, HILIC UPLC-MS and NMR) and in a targeted approach (applying UPLC-triple quadrupole MS). These assays provide the capability to perform discovery studies and then to translate these for patient benefit (the bench-to-bedside approach). The Phenome Centre Birmingham was funded in 2015 and officially opened in May 2016.

Funding announcement for Phenome Centre Birmingham:

<http://www.birmingham.ac.uk/schools/biosciences/news/2014/5m-MRC-Regional-Phenome-Centre-at-Birmingham-05-11-14.aspx>

Press release for the opening of Phenome Centre Birmingham:

<http://www.birmingham.ac.uk/news/latest/2016/05/Phenome-Centre-Birmingham.aspx>

The PCB works closely with the newly opened **Centre for Computational Biology (CCB)**, an interdisciplinary Research Centre that provides dedicated space for bioinformatics activities including a local high performance computing cluster (<http://www.birmingham.ac.uk/research/activity/mds/centres/computational-biology/index.aspx>). Researchers use this high performance cluster in the analysis of large amounts of data generated from biological experiments on gene expression and metabolomics, as well as the BlueBEAR supercomputer which includes dedicated servers for metabolomics jobs. Further research collaborations across Schools (e.g. Computer Science, Engineering, Mathematics, Medicine and others) are also facilitated by this new centre.

For further information on computational and IT resources for research – please visit Birmingham Environment for Academic Research (BEAR) at: <https://intranet.birmingham.ac.uk/it/teams/infrastructure/research/bear/about-bear.aspx> which includes BlueBEAR (HPC cluster), BEAR Research Data Store (with dedicated TB storage for metabolomics) and the BEAR Research Data Network (that prioritised high speed connections for the Phenome Centre Birmingham).

The School of Biosciences

The PCB is primarily physically located with the School of Biosciences at the University of Birmingham. This is the largest biology school in the region, delivering internationally excellent teaching and research across the broad span of modern biology. There is currently an academic staff of approximately 60, conducting research and delivering teaching from the level of individual biological molecules to the study of whole ecosystems.

We have a lively research community, with over 70 postdoctoral research fellows and research assistants, and 120 doctoral research students.



Our ground-breaking research ranges from research into cancer and infectious diseases, such as tuberculosis, to studying the movement and behaviour of orangutans. We also offer major high-technology facilities for research in genomics, metabolomics, proteomics, structural biology and optical imaging (see below). Current research grant income is around £8 million per year, and comes from a variety of sources including research councils, the European Union and charities. The School has an excellent research profile with 90% assessed as international quality supporting an exciting range of teaching programmes.

The People

Key metabolomics investigators at the Phenome Centre Birmingham

Prof. Mark R. Viant holds a Chair in Metabolomics, is **Executive Director of Phenome Centre Birmingham**, Director of the NERC Biomolecular Analysis Facility for Metabolomics, and a Past President of the international Metabolomics Society. As a postdoctoral fellow at the University of California, Davis, he pioneered the application of metabolomics to environmental health issues in aquatic organisms. In 2003 he relocated to Birmingham as a NERC Advanced Fellow with the remit to further develop metabolomics in environmental toxicology. With funding from the NERC, BBSRC, MRC, Wellcome Trust, Wolfson Foundation, EU, Environment Agency and several US agencies, he and his group have developed new metabolomics methods in both 2-D NMR and mass spectrometry. His team has applied these techniques to probe toxicant-induced metabolic changes in a range of organisms. He has demonstrated the need for “phenotypic anchoring” in metabolomics and most notably discovered biomarkers of toxic stress that are predictive of whole organism physiological perturbation. He serves on the editorial boards of *Metabolomics* and *Scientific Data*. Viant has published ca. 150 peer reviewed papers. See <http://www.birmingham.ac.uk/staff/profiles/biosciences/viant-mark.aspx>. His work has recently been recognised by the award of a 2015 Lifetime Honorary Fellowship of the International Metabolomics Society *“In recognition of his pioneering work in environmental metabolomics and for his sustained service to the Society. His vision revolutionized the Society’s operations and reputation, expanding its reach to all corners of the world.”*

Dr Warwick B. Dunn is Senior Lecturer in Metabolomics, **Director of Mass Spectrometry for Phenome Centre Birmingham**, Theme Lead for the MRC-ARUK Centre for Musculoskeletal Ageing and a Director of the Metabolomics Society. He has applied bioanalytical and metabolomics approaches to the study of biological systems for the last 15 years, with the last seven years focused on clinical applications. His research focuses on the development of experimental and computational workflows to study biological systems in close collaboration with Prof. Viant. These tools are then applied in the study of human, health, diseases and ageing to develop new treatments for human diseases, to increase patient benefit and to improve patient outcome and longer-term health. An integral part of this initiative is to apply ‘omics technologies including metabolomics. These studies provide data which are applied to understand molecular pathophysiological mechanisms associated with human health and disease, to act as prognostic or diagnostic biomarkers of disease or to act as biomarkers to define efficacy and toxicity of disease interventions (for example, therapeutics) or to apply as biomarkers in stratified medicine. His group collaborates with clinicians and biomedical researchers in areas of endocrinology, inflammation and Immunology, musculoskeletal health and exercise and complications of reproduction and pregnancy. See <http://www.birmingham.ac.uk/schools/biosciences/staff/profile.aspx?ReferenceId=53168>