University invests £2 Million for environmental genomics and recruits John Colbourne to lead

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The University of Birmingham's School of Biosciences announced today the launch of a £2 million (3 million US dollar) research initiative to build genomics and bioinformatics expertise for the emerging field of environmental genomics.

Environmental genomics uses high-throughput DNA technologies and the analysis of high-dimensional data to link gene functions and interactions to the fate of natural populations coping with environmental challenges, including global climate change. This new research initiative builds upon the School's expertise in cellular, genetic and metabolomic toxicology to understand how organisms respond to environmental stress, particularly from pollution.

There are currently over 80,000 chemicals used by manufacturers of consumer goods that are released into the environment, yet only around 7% have ever been tested for their potential health effects to humans and ecosystems, even in rudimentary ways. As more products are introduced to markets every year, there is now great demand by regulatory authorities and industries for new technologies to quickly, cheaply and effectively measure the possible toxicities of these chemicals.

'Government agencies on both sides of the Atlantic agree that high-throughput genomics are expected to be the basis for environmental and human health protection and remediation by 2015, thus creating a global demand for these skills and technologies', said **Professor Malcolm Press (http://www.birmingham.ac.uk/schools/biosciences/staff/profile.aspx?ReferenceId=9665&Name=professor-malcolm-press)**, Pro-Vice-Chancellor and Head of the **College of Life and Environmental Sciences (/university/colleges/les/index-old.aspx)** at the University of Birmingham.

To jump-start this effort, the University is investing in positions to appoint, post-doctoral fellowships, technicians, doctoral student training and by building impressive genomics, metabolomics, computing and laboratory facilities. The initiative is under the direction of Professor John Colbourne, who has been recruited from Indiana University, Bloomington, USA. Colbourne was genomics director of the Center for Genomics and Bioinformatics, the lead institution to describe the genome sequence of a tiny crustacean called Daphnia. For many decades, Daphnia serves as the primary aquatic invertebrate test-organism by environmental protection agencies around the world. Because of Colbourne's work in conjunction with the Daphnia Genomics Consortium (DGC), the US National Institutes of Health now includes this species within its selective list of model organisms for biomedical research, yet here with special emphasis on understanding how genes and environments interact to determine disease susceptibility.

Daphnia measures 3-6 mm, is particularly sensitive to chemicals, is a keystone species of freshwater food chains, has a remarkable range of adaptive responses to ecological conditions, and shares the most number of genes with humans from among the other invertebrate model species.

'I am excited by this opportunity to help assemble a unique research group that studies genomics to improve the environment. This investment will help catalyze international cooperation and provide a training ground for early career scientists in the field', said Colbourne. *'The University of Birmingham is a natural home for this type of multidisciplinary research,'* he adds. The UK represents half of the European laboratories participating in the DGC, which is open to researchers from around the world wanting to collaborate by sharing resources and expertise.

While at Indiana University, Colbourne has forged strong ties with corporations that share the vision of modernizing environmental risk assessment. These industry-academic collaborations are also providing training on the uses of technologies for the field, including at an annual Environmental Genomics summer course at the Mount Desert Island Biological Laboratory, in Maine, where Colbourne holds an adjunct teaching position.

'Imagine a new cohort of trained scientists working in academia, government or for industry who can reliably forecast potential environmental problems from the biochemical responses of selected animals to stress, long before actual harm is realized', asks **Mark Viant (http://www.birmingham.ac.uk/schools/biosciences/staff/profile.aspx?ReferenceId=9910&Name=professor-mark-viant)**, Professor of Metabolomics at the University of Birmingham and member of the DGC. *'This technology can be a key to help industries manufacture greener products and better manage their environmental and investment risks.'*

The plan for financing the initiative's growth is to leverage this University's initial investment with government research grants and contributions from industry, private foundations and donors.

'The economic rewards from the expanding applications of science that is born of basic genomics research are obvious,' said Colbourne, *'yet the infrastructure and jobs needed to support a large-scale genomics testing and bioinformatics research facility will require investors from all sectors, who are concerned by the increasing demands that humans place on essential ecosystem services, including our need for clean water.'*

Colbourne begins his new job August 1, 2012.

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