



## **iSEQ lunch seminar series**

### **Talk:**

Pervasive Allelic Imbalance Revealed by Allele-Specific Gene Expression in Highly Divergent Mouse Crosses.

### **Speaker:**

Ass Professor Jim Crowley, University of North Carolina at Chapel Hill.

**Venue:** Merete Barker Auditory, The Lakeside Theatres

**Time:** 8 January 2014 at 12.00 – 13.00

### **Abstract:**

The widespread localization of disease-associated variation within regulatory DNA underscores the importance of cis regulatory variation in humans. A thorough annotation of cis regulatory variants in the laboratory mouse in diverse tissues could facilitate understanding of regulatory DNA in the human genome.

Here we provide such a detailed portrait using RNA sequencing in all possible combinations of a three-way diallel. Tissue was the greatest predictor of gene expression, followed by strain, parent-of-origin and sex.

In brain, we observed cis regulatory effects in 11,633 genes (88% of testable genes), exceeding all mouse eQTL studies to date. Cis-regulated brain-expressed genes were enriched for behavioral and neurological phenotypes in knockout mice as well as peripheral blood and brain eQTLs for orthologous human genes. We estimate that at least 1 in every 1,000 SNPs creates a cis eQTL, similar to the fraction of SNPs predicted to alter protein function. For parent-of-origin effects, we identified 98 imprinted genes in brain.

We observed that imprinting is incomplete for most genes, and that cis acting mutations can modify the strength of imprint.

We confirmed dosage compensation equalizing expression between males and females and between chromosome X and autosomes.

We conclude that pervasive regulatory variation underlies complex genetic traits in mice.

Our results, accessible as an online catalog (<http://csbio.unc.edu/gecco>), underscore the importance of laboratory mice to compliment human GWAS.

### **Refreshments:**

Sandwiches will be provided. Therefore, please email Anne Hedemand ([anneh@hum-gen.au.dk](mailto:anneh@hum-gen.au.dk)) by 6 January 2014, if you would like to participate.