GENESYS: The exploitation of genetic variation in gene network inference

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The GENESYS network was recently funded by the BBSRC under the "Mathematics for Systems Biology" (MATSYB) initiative. The goal of the network is to promote the required integration between genetics, bioinformatics and mathematics to facilitate the reverse-engineering of regulatory networks using genetic mapping data and high throughput data, such as transcriptomics. This is an important step toward systems biology approaches where these regulatory networks will be refined and evolve into quantitative models of regulation. While initially focussing on the combination of QTL mapping and gene expression analyses, it is expected that the network will attract interest from other high throughput disciplines such as metabonomics and proteomics. An approach that has started to make an impact on the dissection of complex traits is known as genetical genomics; the combined study of gene-expression and marker genotypes in a segregating population. Genetical Genomics is aimed at detecting genomic loci that control variation in gene expression, so called expression QTL or eQTL (to distinguish them from functional QTL that affect traits at the whole-organism level). A major promise of genetical genomics is that by examining the relationship between transcript location, location of eQTL (*cis* or *trans* in relation to the transcript) and pleiotropic effects of eQTL, it might be able to reconstruct genetic pathways that underlie phenotypic variation. The major challenge in reverse engineering gene regulatory networks is the successful integration of biological knowledge, (e)QTL mapping results, bioinformatics tools and mathematical modelling approaches. The GENESYS network will organise one meeting in each of the three years of the grant.. The conference will be open to all in the research community with an expected number of attendees between 100 and 200. The conferences will feature invited key note speakers as well as contributed papers. The second meeting of the network will take place at ECCS09 in Warwick 21-23 September 2009..

In order to stay informed about this network please note your interest with the network coordinator, DJ de Koning (DJ.deKoning@roslin.ed.ac.uk). The network has its website at www.genesys.ac.uk.