BBSRC/ESRC PhD Studentship

Developing "crowd sourcing" & "gamification" strategies to accelerate analysis, interpretation and generation of added value from biological Big Data

A key priority for the future of Biomedicine is to overcome our present deluge of "biological Big Data" and turn it into a catalyser of precise, predictive and personalized treatments.

Although large-scale approaches like genomics, proteomics, metabolomics or large-scale microscopy phenotyping ("microscopy phenomics") can routinely generate vast amounts of data at the single cell level for thousands of genomic mutations or pharmaceutically-informative drug treatments, most large-scale biomedical data is never fully mined before becoming archived soon after its original publication. New scalable solutions are urgently needed to catalyse the analysis and integration of biomedical data, if we are to accelerate the pace of future medical discoveries.

A way to address this problem could be using Artificial Intelligence and having "Machines help humans" to identify complex patterns of information inaccessible to human intuition. However this strategy is likely not sufficient, as there are currently clear limits to how much machines can interpret the data they obtain, particularly their capacity to establish what could be meaningful biological/biomedical predictions. Thus, to overcome those limitations it might be indispensable to also develop strategies to involve human experts with human priorities and human decision-making power, thereby enabling "Humans help machines" and inform them in return.

In this PhD project we will prototype this type of approach by exploring "crowd sourcing" and "gamification" strategies to accelerate analysis, interpretation and generation of added value from biological Big Data, to test whether this could be a means to engage and empower the biomedical community to catalyse new discoveries.

The student will use as exemplar dataset the Image Data Resource (IDR, http://idr-demo.openmicroscopy.org/), a BBSRC-funded community-wide microscopy phenomics pilot resource recently established at the EBI Hinxton, comprising ~1 million biological experiments with associated annotations characterizing hundreds of biomedically-relevant cellular processes.

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