Fantastic Beasts and Where to Find Them: A Metagenomic Map of London

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It is estimated that 5 million passengers travel on the London underground network daily. It is the oldest and one of the largest underground network systems in the world; 270 stations across 11 lines, spanning 402km.

Previous studies have implied that locations have unique metagenomic fingerprints but not much is currently known about the metagenomic ecosystem of underground transit systems. The Mason Lab at Weill Cornell University formed The Metagenomics and Metadesign of Subways and Urban Biomes (MetaSUB) International Consortium to investigate this further. This consortium unites over one-hundred scientists from more than 50 cities across all continents with the goal of examining mass-transit system microbiomes to construct a world-wide "DNA map".

To achieve this, we carry out a global City Sampling Day (gCSD) annually on the 21st of June. On this day, each city within the consortium deploys a team of scientists and citizen scientists to swab areas on the transit systems. In London, a bench on the platform, a handrail or elevator button and a ticket machine were sampled at each station. These were then sent to the USA for sequencing.

The sequencing data will enable the creation of geospatial metagenomic and forensic genetic maps. Promising results have been obtained from the MetaSUB data both by ongoing analysis within the consortium as well as by external scientists taking part in the Metagenomic Forensics Challenge at the Critical Assessment of Massive Data Analysis (CAMDA) conference. Within the consortium we are also developing ways to visualise this complex data (MetaGenScope) as well as constructing guidelines on how to communicate the results to the public. Data from the London MetaSUB gCSD 2017 will be presented.