

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

High-throughput single-cell PCR using microfluidic emulsions¹

MIRA GUO, LINAS MAZUTIS, JEREMY AGRESTI, MORTEN SOMMER, GAUTAM DANTAS, GEORGE CHURCH, PETER TURNBAUGH, DAVID WEITZ, Harvard University — The human gut and other environmental samples contain large populations of diverse bacteria that are poorly characterized and unculturable, yet have many functions relevant to human health. Our goal is to identify exactly which species carry some gene of interest, such as a carbohydrate metabolism gene. Conventional metagenomic assays sequence DNA extracted in bulk from populations of mixed cell types, and are therefore unable to associate a gene of interest with a species-identifying 16S gene, to determine that the two genes originated from the same cell. We solve this problem by microfluidically encapsulating single bacteria cells in drops, using PCR to amplify the two genes inside any drop whose encapsulated cell contains both genes, and sequencing the DNA from those drops that contain both amplification products.

¹Supported by NSF and Harvard MRSEC.

Mira Guo
Harvard University

Date submitted: 11 Nov 2011

Electronic form version 1.4