NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE
Advanced Environmental Biotechnology Centre
Nanyang Environment and Water Research Institute

Automated Online monitoring of Waterborne Parasites

Objective

To develop a rapid and fully automatic parasite identification and monitoring system to fill the gap of bio-contaminant inspection in water industries worldwide.

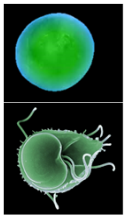
Research members

Prof Liu Ai Qun and team

Waterborne Parasitic Protozoa & challenges

Cryptosporidiosis

Giardiasis



Challenges of current detection technique

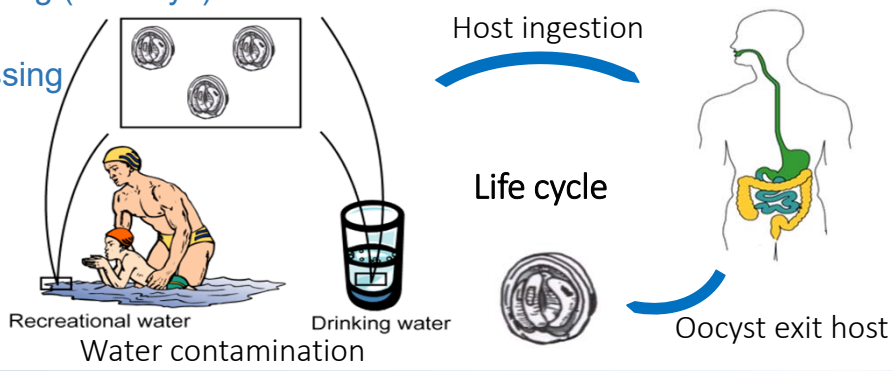
Time-consuming (> 2 days)

Lab-based

Batch processing

Risks in water contamination

- 4.1% of global diseases
- 1.8 m human deaths annually
- 250 to 500 M cases annually



Technological Breakthrough

The system combines a high speed pre-concentration technology, advanced label-free optical identification and state-to-art microfluidic manipulation. It targets on on-line monitoring of ultra-low waterborne parasites in water plants and drinking water distribution systems, It enables identification of *cryptosporidium* and *Giardia* in 10 L water in < 3 hours. It has advantages of fully automatic online testing, label-free, low consumable cost, low maintenance requirement. These features make the system feasible to be integrated into any conventional potable water plants, and adapted in pharmaceutical and food industries. In the second half of 2019, a pre-production prototype will be delivered to one local water plant for on-field trial testing. More units will be tested locally in 2020.

Target market

With long term guidance and support from NRF, PUB and ES, the team has built up a solid technical foundation and established acknowledgement with water industrial agencies and management institutions in different countries. The potential product has raised their interest. It can release operators from labour-intensive manual inspection in developed countries, such as US and Europe, as well as fill the gap in water bio-safety monitoring of developing countries, such as China and India.