## The Hong Kong University of Science and Technology School of Engineering

## Disney-HKUST Grant for Technology and Well-Being

## Transcript of "Gas Sensor for *H. pylori* Bacteria Detection"

Hi, we are a team of four Mechanical Engineering undergraduate students from The Hong Kong University of Science and Technology. We are working on a project supervised by Professor Yi-Kuen Lee (Associate Professor, Department of Mechanical and Aerospace Engineering) and Professor Ying Chau (Associate Professor, Department of Chemical and Biomolecular Engineering).

There are a lot of poor places in Star Wars and a lot of rich places as well. This is an example of a really poor place. This is Tatooine from the Phantom Menace – a very dirty, filthy, poor place full of poor people. There are lots of places such as this on earth as well, and usually these places have very poor quality of water and food. Water contains a lots of pathogens when it is not in good quality. These pathogens can lead to serious diseases.

The most common pathogen present in water is usually a bacteria called *H. pylori*, which is a stomach-based bacteria, if left untreated, this leads to gastric cancer. It is very common in the developing world. In fact, over half of the developing world has been infected by this bacteria, that is a hundred of millions of people.

Unfortunately, most of these people cannot afford to diagnose themselves and end up suffering, even though this bacteria can be easily treated using antibiotics if diagnosed. Because machines that detect this bacteria cost upwards of HK\$100,000. This is very expensive for an ordinary hospital in a developing country to buy. That is why we have invented this – a portable and cheap *H. pylori* bacteria detector that costs only HK\$1,000 to make.

This device detects the presence of two gases – Ammonia ( $NH_3$ ) and Hydrogen Sulphide ( $H_2S$ ). Research has shown that if the concentration of any of these gases is above 1 parts per million (ppm), *H. pylori* bacteria could be present. The device is very easy to use. The user simply blows into it and then after about 3 minutes, the device gives a reading of the ppm of these gases in the person's breath. It is simple and cost effective.

Our prototype could potentially benefit as many as 5 million people if it is widely adopted in Cambodia, and over HK\$80 million can be saved in diagnosis costs. This is our estimation.

With the project, a lot of people in the developing countries can be diagnosed of this *H. pylori* bacteria and therefore, a lot of suffering can be avoided. That is why we believe so much in this project and believe it is so important.