

Visual Artificial Tongue: quantitative water analysis by an off-the-shelf dye array.

Mentor: Dr. Young-Tae Chang

By: Swapan Bhuiyan

The human tongue and nose have between a dozen to hundreds of receptors. These receptors allow us to distinguish different tastes and smells. This idea led to creation of artificial sensory that uses multiple probes. Organic dyes which are used today have been used as visual sensors for over one hundred years. These dyes are available for purchase at most chemistry wholesalers. These dyes are used as a format, commonly known as Tongue. In our lab, we have created a tongue, named New York Tongue 1 (NYT -1). This tongue is used to research Metal Cations, using dyes which are most sensitive and most consistent. We then decided to research water since it is so simple format at molecular level. We wanted to see if our Tongue can detect the differences in different bodies of water. We used twelve different bottles of water, commonly available for beverage use, as our analyte. After testing these analytes, we modified the tongue format to achieve a more sensitive and stable outcome. The water research was, at first done in 384-wells plate. While this format is accurate, we aimed to simplify our project, therefore, we further modified the template to suit a 96 wells plate, which is not only a condensed version of the template, but also more economical. Our analysis show that, while most of the analytes were consistent, three were not. We retested the three samples, however, received similar results to the original. Even though we understand that there are still some issues to be addressed with the 96 tongue format, nevertheless, we concluded that the 384-wells plate is the optimal option in real world application.