

Dr. Gane Ka-Shu Wong, an internationally renowned scientist at the University of Alberta has taken the initiative to sequence 1000 plants (1kp). The project will involve both fundamental questions of plant biology and applied questions - medicinal and agricultural. But why sequence 1000 plants?

As the Alberta government looks to broaden its industrial scope away from fossil fuels, it has to look to new technologies. Information technology and applied life sciences both fall into the category of this investment. Dr. Wong has already attracted a half million dollars in funding from private venture capitalists, so clearly he is not alone in thinking this project is feasible in creating start-up companies. The fundamental plant biology questions are clear; a plant genome will tell you about plant phylogeny and their evolution. The goal of the basic research questions he is undertaking is to “make a splash” in the scientific field, creating noise and buzz about what the University of Alberta and Dr. Wong are undertaking. The second question is on how to apply the data generated.

A good example on applying genomic data into effective therapies comes from a recent synthesis of the plant based anti-malaria drug, artemisinin, by Dr. Jay Keasling’s group at Berkeley. Following up on his promise of mass-producing this drug from simple, single celled yeast, he was able to reduce the cost of producing artemisinin by an order of magnitude. In essence, he took plant DNA sequences and put them into single celled organisms, and got them to perform the same reaction that would happen in a plant cell. Like a microscale artemisinin factory. What Dr. Wong wants to do is open this possibility for thousands of other drugs that depend on the genes expressed in plant cells.

A fundamental facet of this project is that transcriptomes are being sequenced, not genomes. This means that the active genes in the plant are sequenced. While this is imperfect, it will provide a snapshot of gene expression for well over ten thousand genes - a massive improvement to the small handful of genes sequenced in most of the plants chosen for this project. The feasibility of this idea is possible because of a recent demonstration of this technology on rice, in which the computational technology developed by BGI Shenzhen was proven highly efficient. Indeed, Dr. Wong’s longstanding appointment as an associate director of the BGI institute is what makes him confident in his ability to see this project through to completion.

In biology, it is often the most uncommon of organisms that make the best teachers. Dr. Wong uses the word “extremophytes” to describe another component of his sequencing effort, plants with weird and fascinating properties. Plants that can spontaneously combust, plants that produce oil, and carnivorous plants are some of the behaviours that he hopes to unlock with his project. But what he and the province of Alberta are both looking for is to jump start Alberta genomics – turning it into translational research that will benefit the local economy.