

## MSC proposal 4

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### Whole genome sequencing to identify adaptive mutations

Genomic changes are a key part of adaptive evolution. Identifying changes and how they allow species to persist in the face of adversity is an interesting way to observe historical and contemporary evolution. Domestication is an important process where human activity selects for specific mutations and accelerates the pace of evolutionary change. In a changing world, this can be fundamental to food security. With this in mind, we are working with lines of cowpeas (*Vigna unguiculata*) that have been irradiated to induce mutations. Several of these strains have increased drought tolerance and we are interested in the basis of this.

In this project, the student will sequence whole genomes from several different mutant strains, and compare them to their ancestral lineages. This will offer an opportunity to see evolution in action, and to help understand how different types of mutations have driven adaptation to extreme conditions.

This project will train the student in diverse, integrative methods including:

- DNA extraction
- Whole genome sequencing (Nanopore)
- Assembly and analysis of genome content
- Identification of genes evolving to cope with drought stressors

