# NC STATE

### Improving Human and Environmental Health by Engineering Microbial Communities



Goal: Use an inducible genomewide mutagenesis-based approach to create random mutations in the genome and screen variants with increased plasmid copy number.



Zidan Li





**Goal:** Harnesses the large genomes of temperate phages (40–100 kb) to evolve large DNA segments, avoid the accumulation of off-target genomic mutations, and decouple mutagenesis and screening steps.

Al'Abri, Haller, Li, Crook. Nucleic Acids Research. **2022** 

**Precision Probiotics** 



Goal: Build platform for in situ treatment of gut diseases through

## The Crook Lab



### **Group Overview**

The Crook Lab leverages metabolic engineering and synthetic biology tools to develop microorganisms to meet industrial needs, including producing biotherapeutics in situ, advancing plant sciences, and degrading oceanic microplastics.



### **Engineering Plant Root Colonization**



**Tuneable Protein Production of Plant** Microbiome





Goal: Engineer plant root colonization and tool kit for plant microbiome and identify metagenomic factors that enhance plant root colonization.





John Van Schaik





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