Abstract:  
Global challenges like climate change and population growth have intensified the need for more robust crop varieties. Advances in DNA sequencing technologies have facilitated the creation of pangenomes, which identify beneficial traits and inform breeding efforts for more resilient crops. Pangenomic studies have revealed evolutionary patterns, diversity, and deleterious mutations in plants, aiding breeding programs.   
  
Cucumber (Cucumis sativus L.), a key vegetable crop and model plant for sex determination and vascular biology studies, has shown reduced genetic diversity due to domestication. Previous research highlighted important genes linked to agronomic traits and domestication. To capture complete genomic diversity, a gene-based pangenome of 39 cucumber genomes was constructed, identifying 15,924 core genes, 2,474 soft core genes, 5,235 shell genes, and 112 cloud genes. PAV (Presence-Absence Variation) analysis revealed 3,451 genes with high frequency in wild vs. landrace cucumbers, linked to energy production and cellular organization, and 2,895 genes in landrace vs. cultivar cucumbers, linked to plant growth and stress response. This project provides valuable resources for cucumber breeding and pangenome studies.

Personal Statement:

My time as a high school intern at BTI was an incredible experience! Despite my limited knowledge of bioinformatics and plant science at the outset, the welcoming atmosphere of BTI and the warm smiles from my lab members quickly dispelled my nervousness and made me feel right at home. I am deeply honored to have worked in Dr. Fei’s lab, where I conducted fascinating bioinformatics research using tools like R, Python, Linux, Orthofinder, and Blast2Go, while also applying cutting-edge biology knowledge and learning to “think like a scientist.” This experience has not only enriched my understanding of bioinformatics and plant science but also ignited a passion for scientific research that I will carry forward in my academic and professional journey.  
  
I want to give special thanks to my mentor, Xuebo Zhao. Her detailed and patient guidance, encouragement when I faced challenges, and dedication to ensuring I completed my tasks on time were invaluable. Words cannot fully express my appreciation for her support and mentorship.