

R.N. Robertson Travelling Fellowship report 2023, Celine Mens, The University of Queensland

I obtained my PhD in molecular plant biology at the University of Queensland in 2022 focussing on nitrogen-dependent regulation of legume nodulation. Since then, I started a postdoc position on legume genomics which involves creating a pan-genome as a tool to improve symbiotic nitrogen fixing efficiency in mungbean. To do so, I generated large amounts of HiFi PacBio and RNAseq data of eight mungbean accessions capturing genetic diversity in an Australian Nested Association Mapping (NAM) population to assemble into a mungbean pan-genome. We had planned to work with the bioinformaticians at the National Center for Genome Resources (NCGR) in Santa Fe, US to help us with the high-computing needed to create a pan-genome and make it publicly available. However, we recognised the importance of also having in-house expertise and knowledge for genome analysis and interpretation within our team.

I had the opportunity to visit NCGR for two weeks with the support of the R.N. Robertson Travelling fellowship in March 2024. The team at NCGR manage the Legume Information System (LIS) which houses genome data for commonly researched legumes like mungbean, cowpea, soybean and peanut. They curate the sequences and provide links between data storage and tools like BLAST as well as tools their team have developed like the Genome Context Viewer. I had the chance to immerse myself in the world of bioinformatics with someone on hand to help trouble-shoot every error that popped up in the HPC (High Performance Computing) terminal. They took me through every step needed to go from sequencing data to a structurally and functionally annotated genome, as well as creating a user-friendly interface that would allow data sharing with my supervisor and colleagues that did not require a terminal interface. While in the same time-zone, I was also able to attend a workshop on differential gene expression run by NCGR while my analyses were running in the background. My PhD research did not rely as heavily on bioinformatics and it has been great to expand my skillset in this way.

On my weekends, I had the chance to explore the beautiful city of Santa Fe with its rich cultural history, the New Mexico landscapes, and the snowy mountains in southern Colorado.

I would like to express my gratitude to the Australian Society of Plant Scientists, the R.N. Robertson Fund and the University of Western Australia for providing me with the funds to visit NCGR. I would also like to give a big thank you to Andrew Farmer and Joann Mudge for their help and time invested, and their continued involvement in this research. Lastly, I would also like to thank my supervisor Michael Udvardi for his support and helping me connect with the team at NCGR.



Figure 1a and b. indigenous art in the town centre of Santa Fe and horseback riding on the weekend in the beautiful New Mexican country.