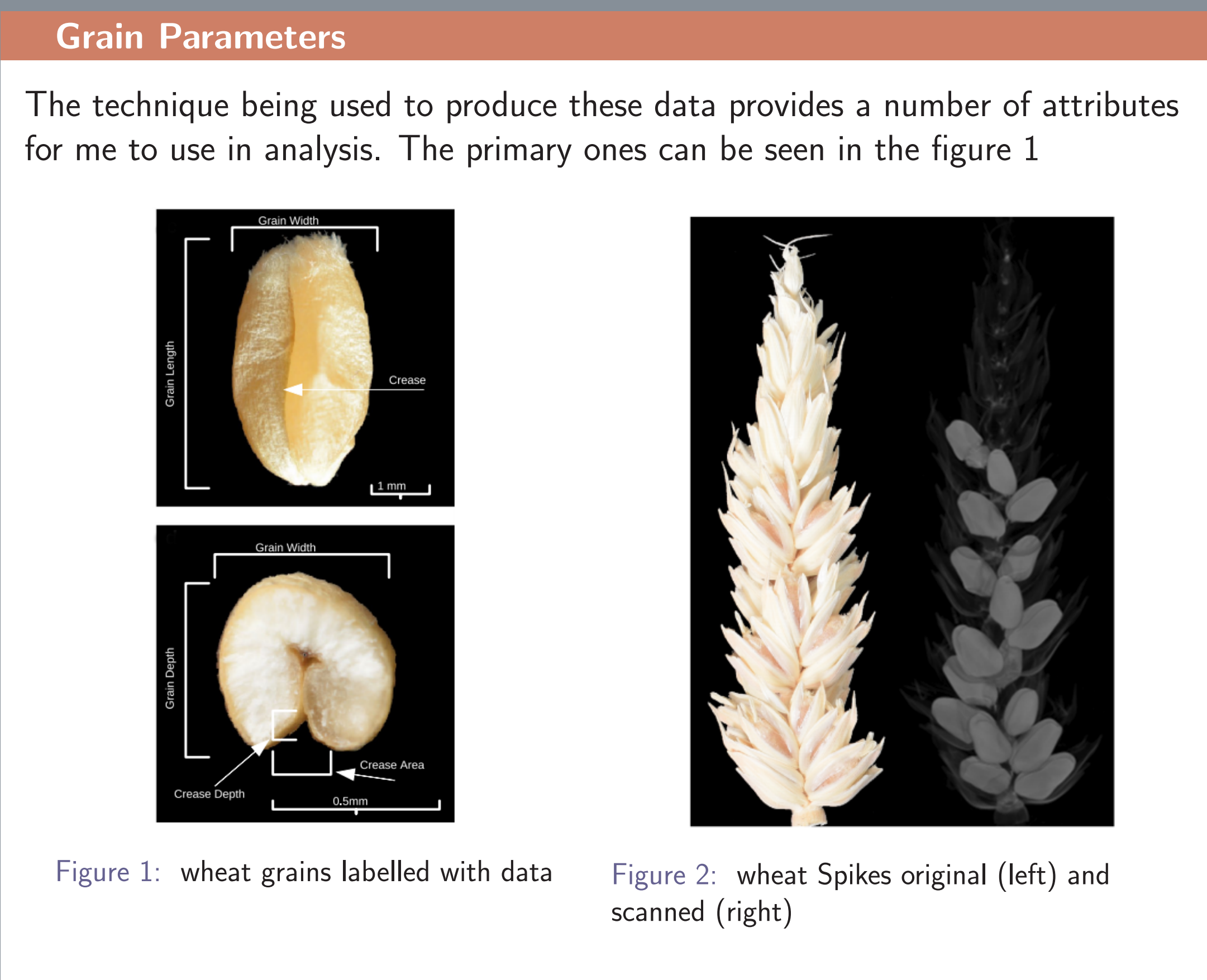


## Introduction

My Project's goal is to examine the effects of domestication in Wheat through the use of  $\mu$ Computed Tomography. This will be done by using a novel technique for a detailed extraction of 3-dimensional morphometric data of wheat grain [1].

I have a wide range or primitive, non-domesticated wheat varieties as well as their cultivated relatives. These genotypes also provide a nice gradient of genome shape and size (Ploidy) which could also provide great insight into how genome structure effects grains.

I aim to modify, improve and use the outlined method to extract data from these wheat varieties to create a unique data-set. I shall then create statistical analysis software which can reliably, produce answers to hypothesis aimed at these data.



## Research Aims

Primarily I have three main null-hypothesis which I hope this project will be able to reject:

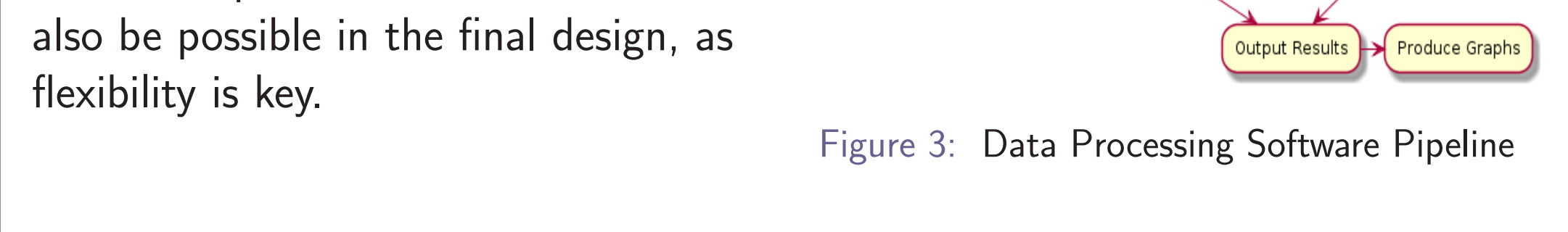
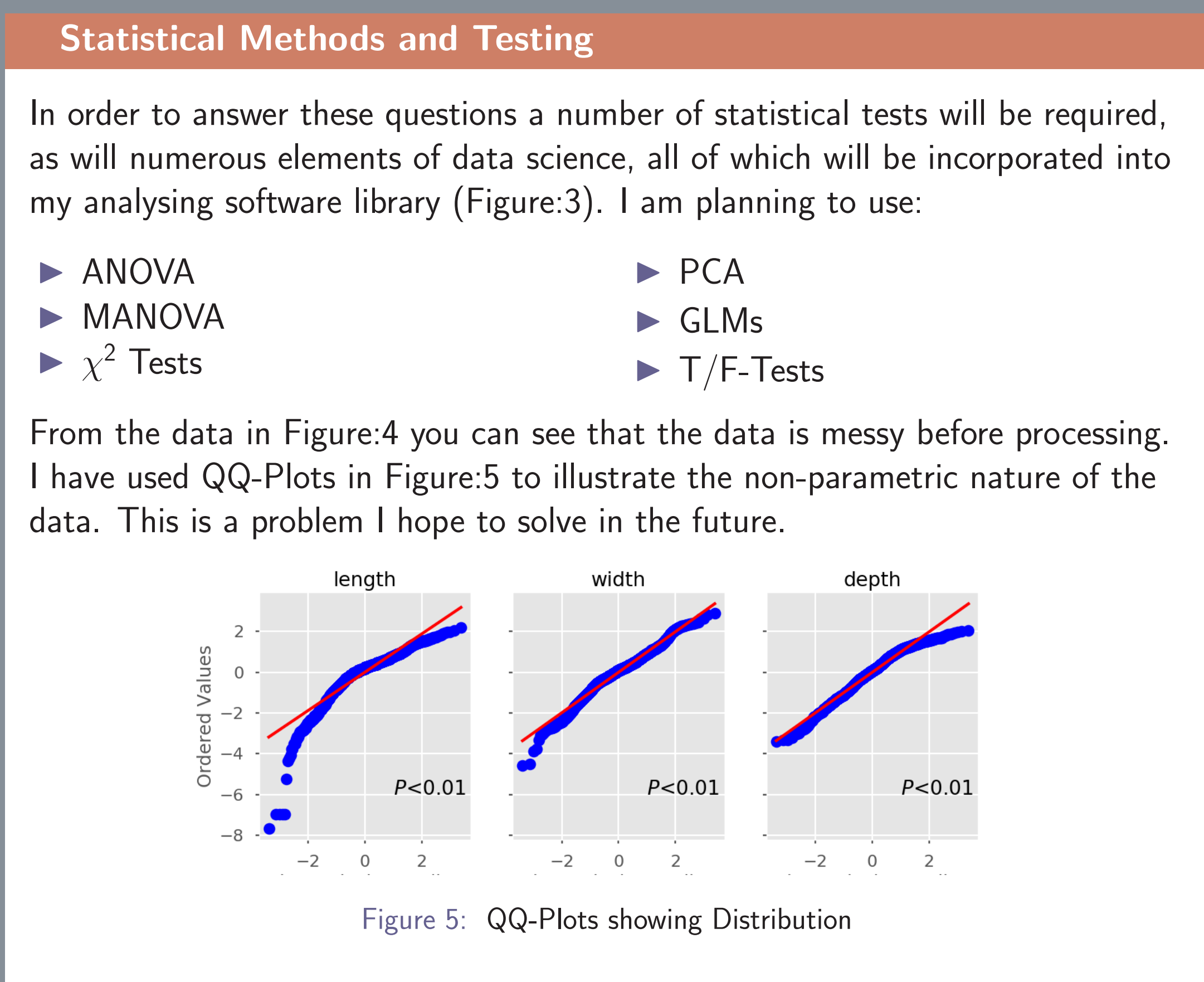
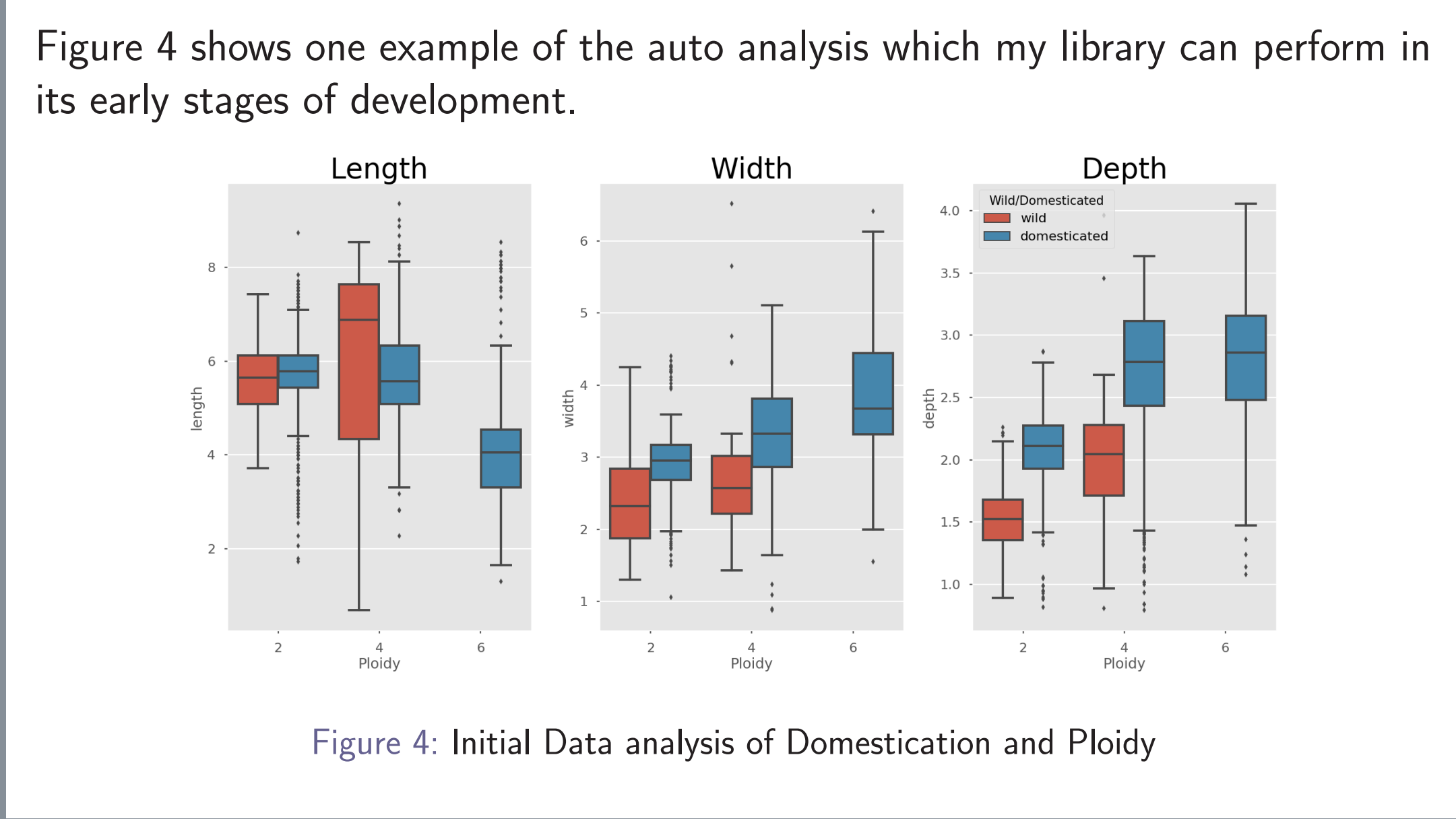
- ▶  $H_0 =$  Domestication has no effect on the morphometric properties of wheat
- ▶  $H_0 =$  Ploidy has no effect on the morphometric properties of wheat
- ▶  $H_0 =$  There is no difference in hulled and non-hulled genotypes

## Current Progress

My work to date has been primarily focused on modifying and adapting 3D analysis software to fit the required parameters to work with such a varied data source.

Additionally I have been building a data processing library whichs aims to:

- ▶ simplify data input
- ▶ perform data cleaning
- ▶ automatically generates plots
- ▶ handles data from multiple sources
- ▶ adding additional experiment parameters



## Future Work

My main aim for the future is to fully implement the proposed statistical library, once completed I can focus on testing my outlined hypothesis. I will also be aiming to make use of the *scipy* data models packages in Python.

## Further Information

For more information on this project I recommend keeping up-to-date with my development blog which can be found at <http://www.users.aber.ac.uk/nah26> Also with Dr. Hugo Oliveira's work which can be found on Google scholar provides a great deal of insight into the primitive species and their phylogeny.

## Acknowledgements and Thanks

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- ▶ Dr. Candida Nibau
- ▶ Prof. John Doonan
- ▶ Dr. Hugo Oliveira
- ▶ BBSRC
- ▶ Dr. Kevin Williams

## References

[1] Nathan Hughes, Karen Askew, Callum P. Scotson, Kevin Williams, Colin Sauze, Fiona Corke, John H. Doonan, and Candida Nibau. Non-Destructive, high-Content analysis of wheat grain traits using X-Ray micro computed tomography. *Plant Methods*, 13(1), 2017.