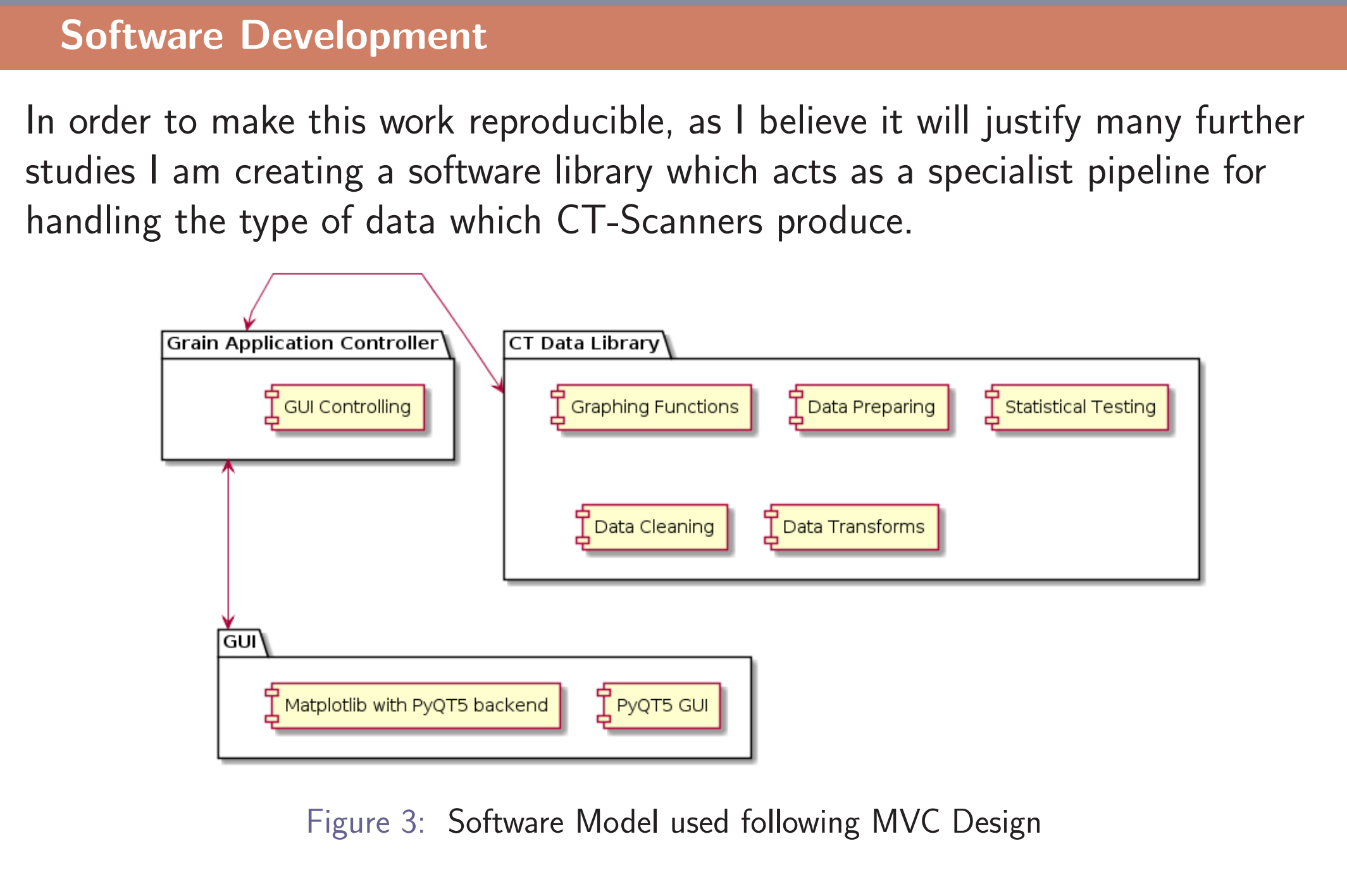
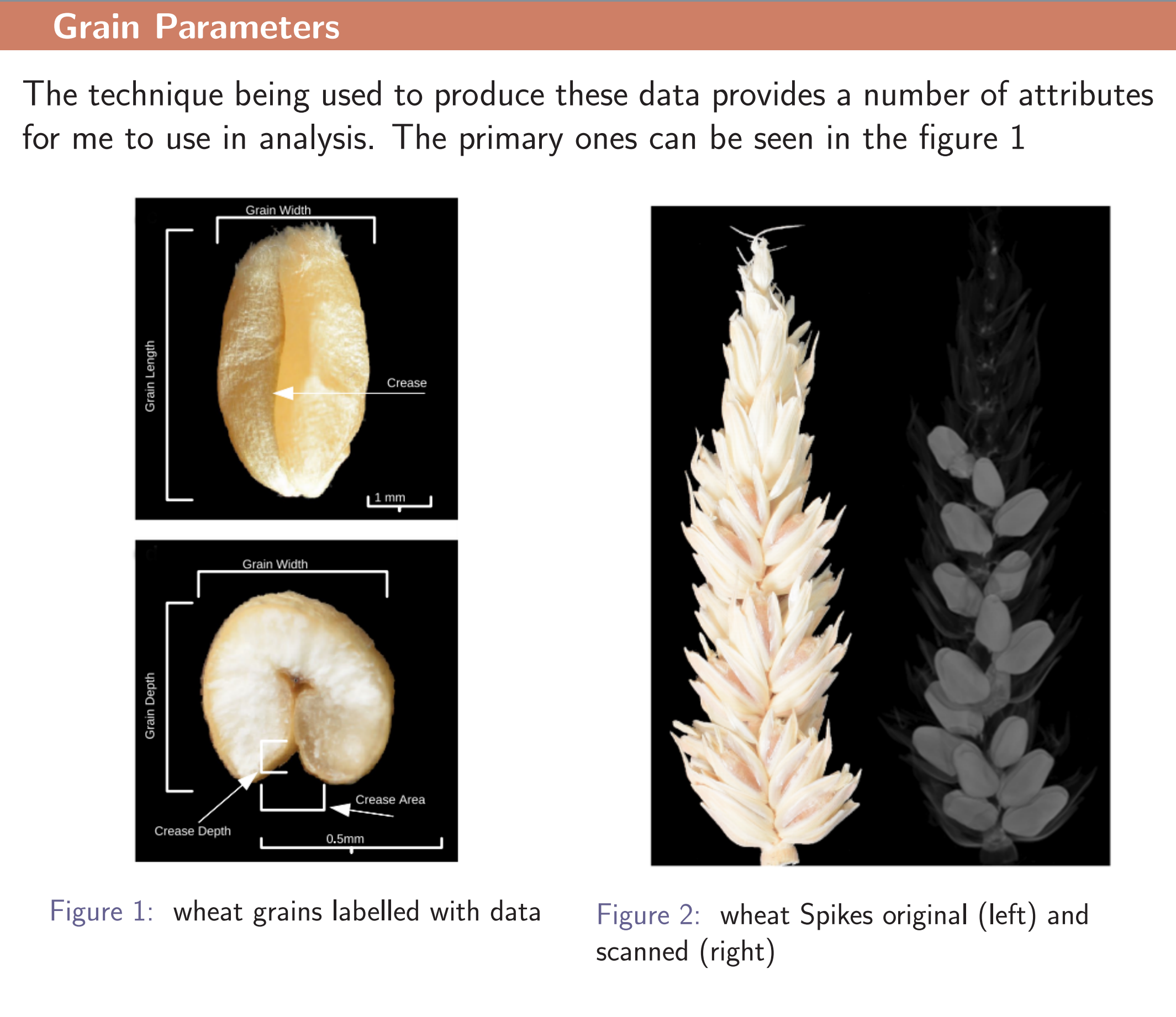


Introduction

My Project’s goal is to examine the effects of domestication in Wheat through the use of μ 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.



Future Work

My main aims 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 in order to better model the data and to search for more vital underlying meanings in the data I’ve created.

Hypothesis testing will act as an ideal test for this software and it’s ability to be used for scientific research as a software tool.

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 [2].

- 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

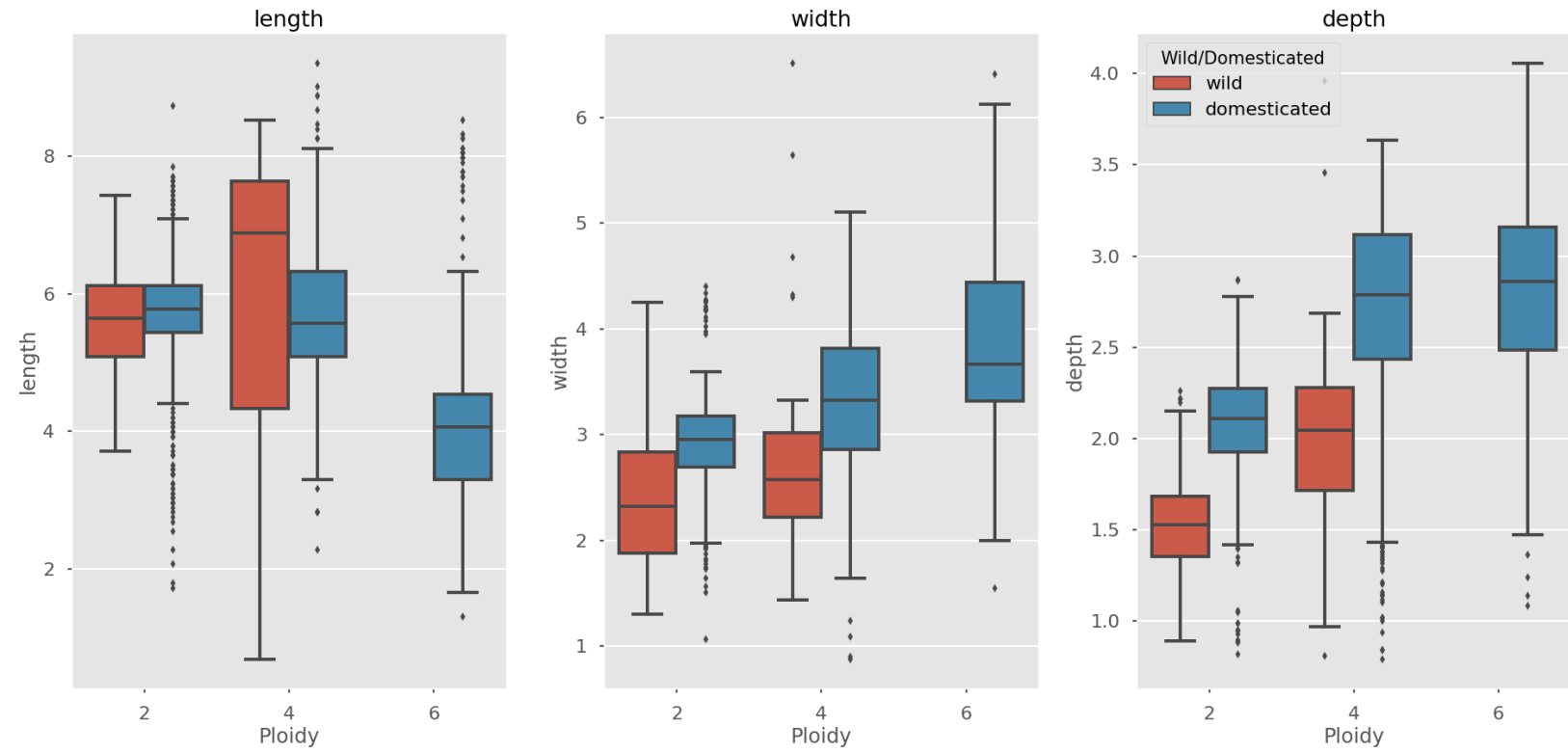
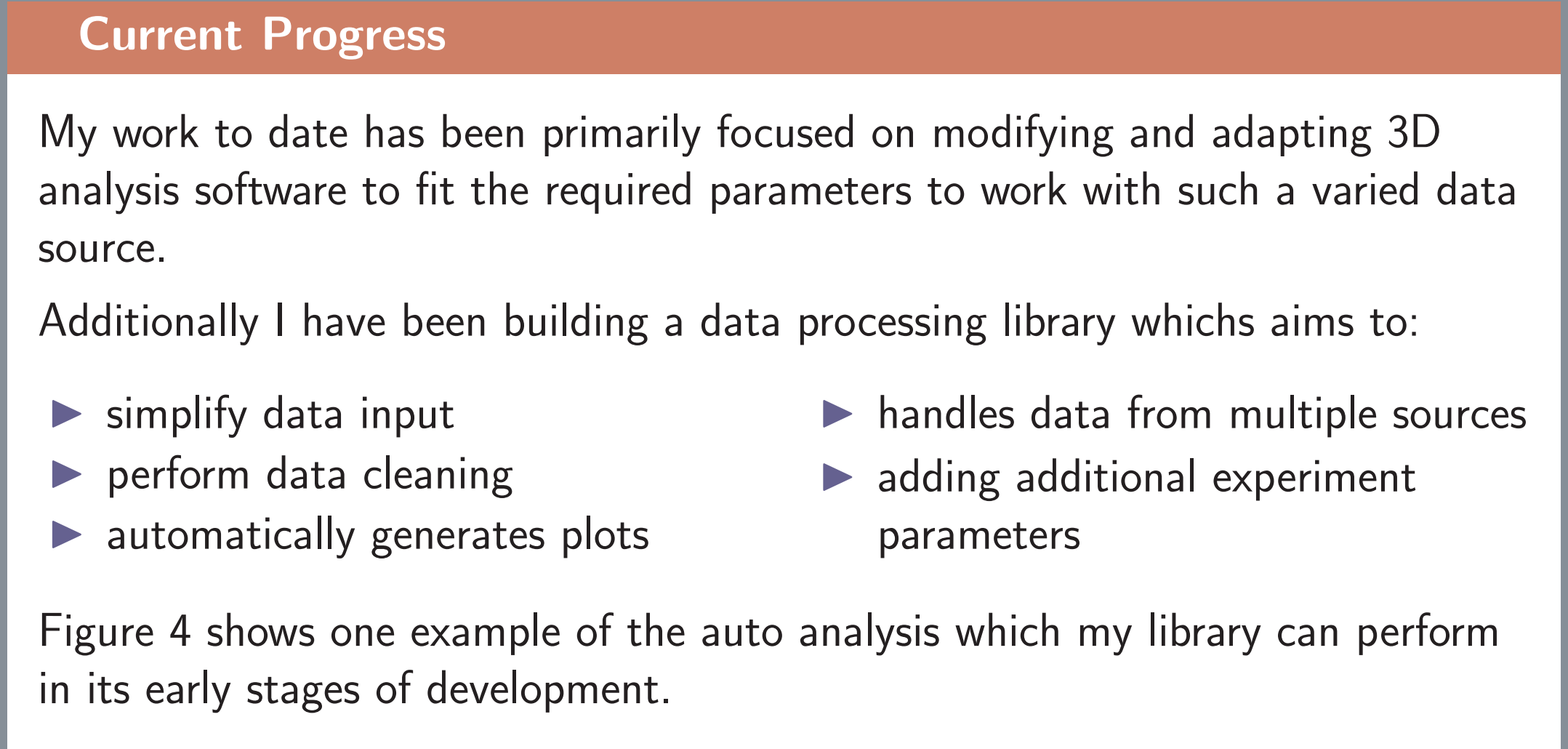
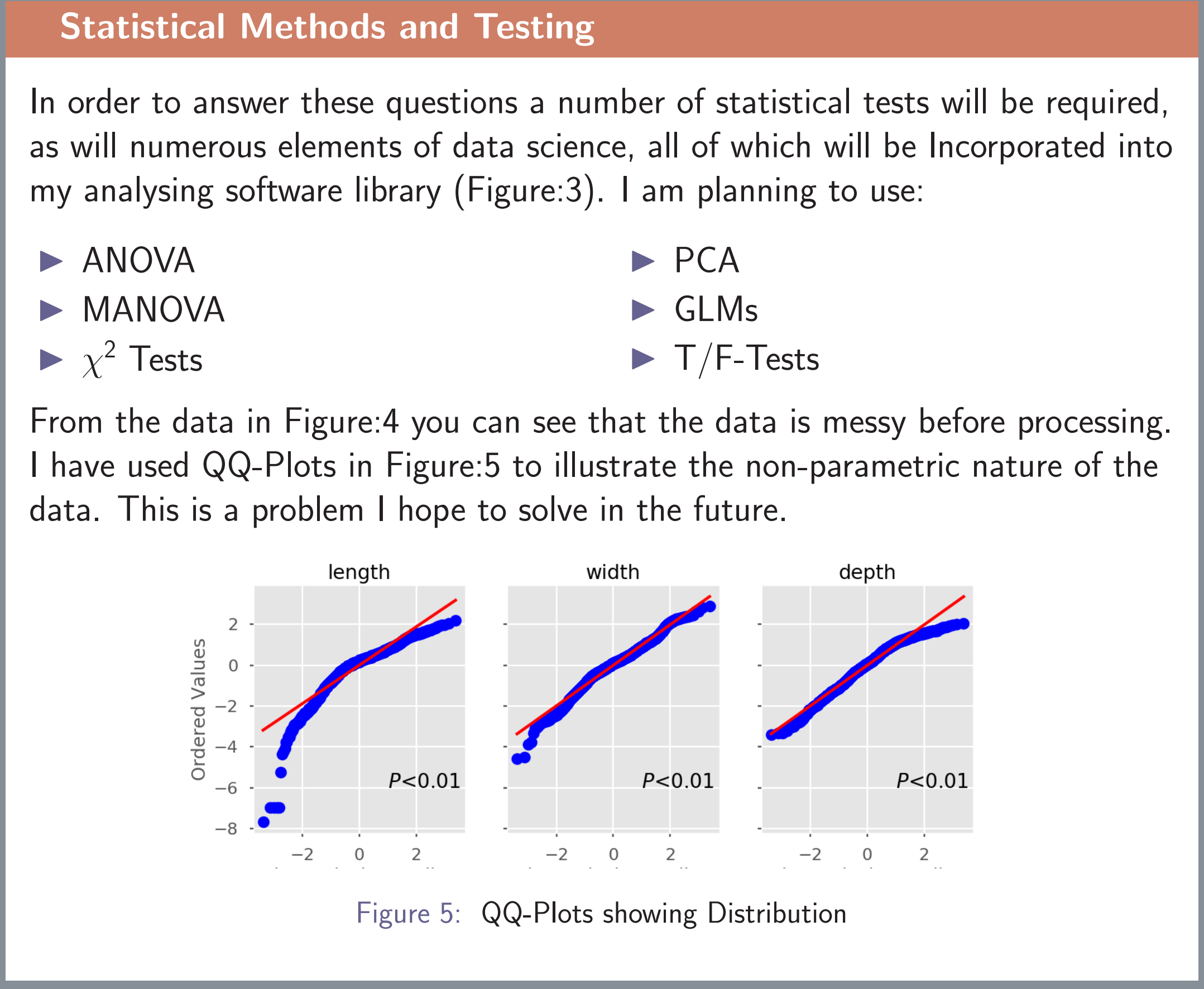


Figure 4: Initial Data analysis of Domestication and Ploidy



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 - ▶ Dr. Hugo Oliveira
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 - ▶ 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), nov 2017.

[2] Hugo R. Oliveira, Michael G. Campana, Huw Jones, Harriet V. Hunt, Fiona Leigh, David I. Redhouse, Diane L. Lister, and Martin K. Jones. Tetraploid wheat landraces in the mediterranean basin: Taxonomy, evolution and genetic diversity. *PLoS ONE*, 7(5):e37063, may 2012.