Division of Biostatistics and Bioinformatics

Writing your Dissertation

Biostatistics dissertation content guidelines A Biostatistics PhD dissertation will typically contain five chapters (although this may vary).

* Important: Please note that this document is strictly for informational purposes (internal use). Always consult with your Dissertation Committee and with UC San Diego's Graduate Division for the official guidelines.

Chapter 1. Introduction

This chapter introduces the research problem and outlines the relevant background. While expansive details of all relevant published works should be avoided, this chapter should summarize all pertinent scientific literature to provide the information necessary for understanding what is currently known and how the dissertation will contribute in an important way to expanding this knowledge. This chapter provides the requisite arguments to establish the importance of the problem as a statistical research topic. Often, example data from actual scientific studies are highly useful for motivating the research problem. The chapter should conclude by briefly summarizing the research approach to the dissertation and the organization of the remaining chapters.

Chapters 2-4. Distinct Aspects of the Research

Each of these chapters typically addresses a distinct sub-problem related to the general theme of the dissertation. A clearly articulated goal and a demonstrated solution to each subproblem should be included.

E.g., for a subproblem involving new application of a statistical method to a biomedical domain, details on the scientific context, prior approaches and how the new method advances the field must be articulated. The method must be applied to data from an actual scientific study, and if appropriate compared to other existing approaches. If

appropriate, simulation studies may be used to demonstrate the utility of the application and should be provided in enough detail to allow replicability by others.

For a subproblem which involves developing new methodology, the problem to be solved should be clearly stated, and the mathematical development should be presented in detail. Any new theorems and proofs (as well as relevant existing theorems) should be provided as necessary for analytical evaluation of the properties of the new methods. Simulation studies may be necessary to empirically evaluate the properties of these methods; the simulation designs should be described in sufficient detail to allow replication of the results by others. Comparisons should be made to existing methods, if any, for addressing the same research problem. Example data from actual scientific studies should be used whenever possible to illustrate the utility of the new methodology.

Results of the applied and methodological work should be clearly and thoroughly presented in figures and tables that are self-contained. Software code for the simulations and data analysis should be included in an Appendix, and placed in a repository such as GitHub. Anonymized, deidentified data should also be provided when possible.

Chapters 5. Conclusions and Future Work

The final chapter should discuss the research findings in a unified framework and provide an overall perspective for the reader, including limitations of the research and future work to be performed. It may be helpful to briefly recapitulate the state of the field at the outset of the research, summarize the main results of the dissertation, explain how the current work provides an important contribution to existing knowledge, point out any limitations of the newly-developed methods, raise new questions that may have arisen out of the research, and propose future work to address existing gaps in knowledge.

General Writing Guidelines

A dissertation is a description and interpretation of the research conducted by the candidate that qualifies them for the degree of PhD.

Wherever possible (particularly the introductory and final chapters), the dissertation should be written so that the material is accessible to those not working in the specialized area of research. Every member of the dissertation examination committee should be able to understand the main ideas in the document as a whole, and the details of each section must be understandable to at least one committee member with the expertise to verify that its content is sound.

The document should be written in English with correct spelling and grammar. Having the text of the dissertation corrected and edited for clarity by a professional or friend is acceptable and highly recommended. A committee member can refuse to accept a dissertation with excessive grammatical or typographical errors.
There is no formal minimum or maximum length. The dissertation must give an in-depth account of the background and the research question addressed, as well as a detailed description of the methods and results that is typically more specific than that found in the published literature.

The manual titled "Preparing Your Dissertation: a Manual for Graduate Students" outlines the overall structure of the dissertation in terms of general formatting and required parts such as the Title Page, Abstract, etc. This manual should be consulted for specifications regarding these components. This manual, however, does not address the substantive chapters of the dissertation. That guidance is provided above.