The Application of Machine Learning Techniques Towards the Optimization of High Energy Physics Event Simulations within the ALICE[[1]](#footnote-2) TRD[[2]](#footnote-3) at CERN[[3]](#footnote-4)



Christiaan Gerhardus Viljoen

Department of Statistics

Faculty of Science

University of Cape Town

This dissertation is submitted in partial fulfilment of the Degree of Master of Science

This dissertation is dedicated to my mother, Elizabeth Suzanna Bloem Viljoen, who has always inspired me to follow my higher passions, despite the myriad difficulties that life makes us face; and to search fearlessly and incessantly for the deeper truths underlying our everyday world.

*“*

*A man may imagine things that are false, but he can only understand things that are true, for if the things be false, the apprehension of them is not understanding.*

*”*

*—Sir Isaac Newton*

Declaration

This dissertation is the result of my own work and includes nothing, which is the outcome of work done in collaboration except where specifically indicated in the text.

It has not been previously submitted, in part or whole, to any university of institution for any degree, diploma, or other qualification.

In accordance with the Department of Statistics guidelines, this thesis is does not exceed 20,000 words.

Signed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Christiaan Gerhardus Viljoen, B.Sc., B.Sc. (Med.) (Hons.),

Cape Town

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| --- | --- |
| ALICE | A Large Ion Collider Experiment |
| TRD | Transition Radiation Detector |
| CERN | European Organization for Nuclear Research |
| QGP | Quark Gluon Plasma |
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# Introduction

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