#### Thesis Proposal

# A DISSERTATION SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL OF THE UNIVERSITY OF MINNESOTA BY

Vaibhav Bhushan Sharma

# IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Stephen McCamant

Dec, 2018

© Vaibhav Bhushan Sharma 2018 ALL RIGHTS RESERVED

### Acknowledgements

There are many people that have earned my gratitude for their contribution to my time in graduate school.

#### Dedication

To those who held me up over the years

#### Abstract

#### Contents

A	cknowledgements	i
D	edication	ii
$\mathbf{A}$	bstract	iii
Li	st of Tables	vi
Li	st of Figures	vii
1	Introduction	1
2	Physics of Neutrinos	2
3	Experiment	3
4	Simulation	4
5	Event Reconstruction	5
6	Data Analysis Strategy	6
7	Event Selection	7
8	Analysis	8
	8.1 Analysis Procedure	8
	8.2 Analysis Result	8

9 Conclusion and Discussion	g
References	10
Appendix A. Glossary and Acronyms	11
A.1 Glossary	11
$\Delta 2 - \Delta c$ ronyms	11

#### List of Tables

A.1	Acronyms																		1

# List of Figures

#### Introduction

- Chapter 1 presents adapter synthesis.
- Chapter 2 presents the need to have path-merging with adapter synthesis.
- Chapter 3 presents a path-merging approach integrated symbolic execution of Java bytecode.
- Chapter 4 describes an application of adapter synthesis towards binary program repair.

# Physics of Neutrinos

Experiment

Simulation

#### **Event Reconstruction**

Data Analysis Strategy

**Event Selection** 

## Analysis

- 8.1 Analysis Procedure
- 8.2 Analysis Result

### Conclusion and Discussion

#### References

#### Appendix A

#### Glossary and Acronyms

Care has been taken in this thesis to minimize the use of jargon and acronyms, but this cannot always be achieved. This appendix defines jargon terms in a glossary, and contains a table of acronyms and their meaning.

#### A.1 Glossary

• Cosmic-Ray Muon (CR  $\mu$ ) – A muon coming from the abundant energetic particles originating outside of the Earth's atmosphere.

#### A.2 Acronyms

Table A.1: Acronyms

Acronym	Meaning
$CR\mu$	Cosmic-Ray Muon