

An Introduction to L^AT_EX and Me

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Abstract

The purpose of this report is to demonstrate my capabilities to create a document using L^AT_EX. This includes normal header information, such as title, author, date, abstract, and acknowledgments. The capabilities include creating report sections for an executive summary, where I grew up, my program of study, why I picked my program of study, why I am taking Assurance Fundamentals, and what I hope to learn from the course.

Acknowledgments: Professor Susan Older helped me formulate the ideas for this exercise and our textbooks.

1 Executive Summary

All requirements for this project are satisfied. Specifically,

Report Structure Our report contains a title, author, date, abstract, and acknowledgments.

Report Contents Our report has the following content:

1. Executive Summary
2. Where I grew up
3. My program of study
4. Why I picked my program of study
5. Why I am taking Assurance Fundamentals
6. What I hope to learn from Assurance Fundamentals

Use of the following list structures We successfully use the following list structures

- Description lists
- Enumerated lists
- Itemized lists

Reproducibility in L^AT_EX Our L^AT_EX source files compile with no errors.

2 Where I Grew Up

I was born in the isle of Manhattan in New York City. As a native New Yorker, I spent the first eighteen years of my life in what New York City dwellers call, *the City*.

What I liked about New York City was the food and the museums. What I disliked was the noise, pollution, the constant “busy-ness”, and the almost complete lack of fresh air, green grass, trees, and a natural environment. Everything seemed artificial and fake to me.

3 My Program of Study

I will answer this from my perspective of a faculty member in EECS. My general research area is computer security. My specific interests are *formal verification of integrity, security, and correctness*. I use logic and computer-assisted reasoning tools, such as the HOL theorem prover. My focus on *mission assurance*, that is, assuring the integrity of command, control, and communications (C3) for cyber-physical operations.

4 Why I Picked My Program of Study

I will answer this question from my perspective as a professor teaching in the MS Cybersecurity program. My first introduction to computer security was from one of my Ph.D. students Lt Col. Donna Peterson. At the time, she was in charge of the Computer Security Branch of the Air Force Research Laboratory in Rome, New York.

One day, she came into my office and asked, “*Do you know anything about computer security?*” My first thought was about computers in locked rooms. That is how it all began. Because of LTC Peterson, I spent 1995 – 1999 at the Defensive Information Warfare Branch of the Air Force Research Laboratory on leave from Syracuse University working as a US Government employee.

My interest in formal verification using theorem provers arose out of my eleven years at General Electric as a computer architect and chip designer. One of my products is a custom-radiation hard CMOS processor with a GaAs transceiver to control over 100 thousand phased array antenna elements for space-based radar. In 1985, our design worked on first silicon, but suffered a flaw in a bit-serial multiplier unit. If we had the formal verification tools in higher order logic we have now, this flaw would have been detected and eliminated.

5 Why I am Taking Assurance Fundamentals

I will answer this from the perspective the perspective of a faculty member in the MS Cybersecurity program. Restated, the question for me is why I am teaching this course? There are two parts to this answer.



Figure 1: 2014 Air Force Research Laboratory ACE Class

1. The faculty committee putting the curriculum together created this course because of its focus on formally verifying security properties using logic and theorem proving tools. The committee's opinion was that the capabilities students acquire in this course distinguishes Syracuse University's MS Cybersecurity program from all other MS Cybersecurity program. (**Note:** I was not on the committee making this decision).
2. My long-term objective is for engineers and computer scientists to routinely be capable of designing systems with proven integrity and security. Integrity and security is crucial given the increasing size and reliance upon the Internet of Things (IoT), which is a global C3 network with no security concept of operations (ConOps).

6 What I Hope to Learn in Assurance Fundamentals

What I hope to learn are effective ways to convey assurance capabilities to you as MS Cybersecurity students. This course is the continuation of a journey that started in 2003 with the Air Force Research Laboratory's Advanced Course in Engineering (ACE) Cybersecurity Boot Camp. The textbook *Access Control, Security, and Trust* is a result of our experiments in teaching mission assurance. We have continued our experiments in teaching mission assurance with National Science Foundation support. This support, as well as support from AFRL, resulted in the second book you are using, *Certified Security by Design Using Higher Order Logic*. A revised and augmented version of this book will be published by CRC Press.

There is one last thing I want to say to you: *faculty and researchers in other universities think what you are learning here is impossible for students at the BS and MS levels to learn*. In fact, the CRC Series editor for Cryptography and Security, who is a faculty member at the University of Maryland, expressed his doubts that MS students at Maryland could learn what you will learn in this

course.

Fortunately, we have taught over 350 students, most at the BS level, from over 50 US universities and the United Kingdom what you are learning here. Figure 1 is a photograph of the 2014 AFRL ACE class, which included people from both US universities, UK Ministry of Defence, and UK active duty military personnel.