

NICHOLAS LEU

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EDUCATION

Singapore University of Technology and Design (SUTD)

Singapore

May 18 to Sept 21

- Bachelor of Engineering (Information Systems Technology & Design)
- Focus track: Cybersecurity

WORK EXPERIENCES

iTrust, Centre for Research in Cyber Security, SUTD

Singapore

Sep 20 to Apr 21

Student Researcher

- **Project Title: Attack Designer Tool for EPIC Digital Twin**
- Implemented an Attack Designer Tool for the EPIC (Electric Power and Intelligent Control) Digital Twin, which is a virtual copy of the actual power grid testbed housed in SUTD.
- Designed the Attack Designer Tool such that iTrust researchers can easily launch Man-in-the-Middle attacks onto the EPIC digital twin, allowing them to conduct a variety of malicious actions, such as spoofing the values being read from target IEDs.
- Created a simple user interface which allowed for greater ease of usage and faster execution of attacks.
- Shown efficient usage of cybersecurity-related tools like Ettercap and Wireshark to aid in the execution of the Man-in-the-Middle attacks. Used packet manipulation libraries like Scapy as well.
- Listed as Co-Author in an academic paper for the International Journal of Critical Infrastructure Protection (pending approval) due to his contributions to the Attack Designer portion of the project.

Agency for Science, Technology and Research (A*STAR), I2R

Singapore

Jun 20 to Sep 20

Researcher, Intern

- **Project Title: Automated Cryptanalysis of Lightweight Block Ciphers**
- Implemented Simon and Speck family of lightweight block ciphers, which can be used by organization for future research.
- Implemented key solvers for both Simon and Speck, using the concept of Differential Fault Analysis (DFA), which can reliably extract the full key schedule for all configurations of the ciphers.
- Conducted further research and discovered a new method to lower the number of fault injections required during DFA of the Speck cipher, based on information leaked during the modulo addition of each round.

iTrust, Centre for Research in Cyber Security, SUTD

Singapore

Mar 20 to Jun 20

Student Researcher

- **Project Title: Intrusion Detection system for EPIC Power Grid Testbed**
- Developed Intrusion Detection Software, using Python, to detect unauthorized access into iTrust's Power grid testbed, EPIC (Electric Power and Intelligent Control).
- Applied concept of Invariances to systematically create checks for different testbed conditions, which helps to determine whether there has been an unauthorized breach into the power grid.

ACADEMIC PROJECTS

Singapore University of Technology and Design

Singapore

Jan 21 to Aug 21

Capstone Project

- Worked in a team of 6 to develop a childcare centre management application that consists of both mobile and web components.
- Single-handedly set up the entire backend infrastructure of the application, which included a Node.js server and PostgreSQL database.
- Hosted backend on AWS cloud, showing proficiency in using various AWS tools like Elastic Beanstalk, S3 and EC2.
- Managed backend security by applying effective security practices such as enforcing proper AWS cloud policies, using ORMS to ensure safe database interaction and utilizing industry-standard authentication services such as Auth0.
- Project was highly praised by professors, earning the highest grade and also being chosen to be showcased during capstone presentation day.

Singapore University of Technology and Design

Singapore

Jan 20 to May 20

Web Application for Capstone Project Allocation

- Designed a web application in a team of 5, which aimed to streamline the space allocation process for senior student's final year projects.
- Contributed mainly to front-end development of web application, using mainline web development tools like HTML5 and CSS.
- Demonstrated the capability to learn quickly and efficiently, due to the ability to create a working and visually appealing web application in a day's time, despite never having learnt any web development tools before.

Singapore University of Technology and Design
Android Application "FoodShare"

Singapore
Sep 19 to Dec 19

- Designed and presented an android application in a team of 5, which aimed to simplify the act of pooling food orders, to professors and received an A grade.
- Demonstrated understanding and usage of various design patterns: Singleton, Adapter, Observer Design patterns.
- Contributed greatly to the Graphical User Interface of the application, using both Android Studio's in-built XML editor and Adobe Illustrator extensively.

CO-CURRICULAR ACTIVITIES & COMMUNITY SERVICE

Willing Hearts, Soup Kitchen
Volunteer

Singapore
Mar 20 to Present

- Helped with various tasks, such as preparation of ingredients and packing of lunch boxes, to aid in the soup kitchen's job of preparing, cooking and distributing around 5000 daily meals to over 40 locations island wide.
- Beneficiaries include the elderly, the disabled, low income families, children from single parent families, or otherwise poverty-stricken families, and migrant workers in Singapore.

ADDITIONAL INFORMATION

- Have experience working with various programming languages: Java, Python, C programming
- Elementary in HTML, CSS, JavaScript
- Have experience working with various AWS cloud services, such as AWS Elastic Computing (EC2) and AWS Lambda.
- Have experience working with databases such as SQL and Amazon Neptune.
- Have experience working with LaTeX
- Proficient in Adobe Photoshop, Adobe Illustrator and Adobe Premiere Pro
- Fluent in English, Mandarin (spoken & written)
- Enjoys working on Capture-The-Flag rooms and learning from cybersecurity websites like TryHackMe