

## Experience

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### Centre for Research on Software Engineering Technologies

Development of an automated tool for detecting C/C++ software vulnerabilities

📅 Mar 2021 – Oct 2021 | 🛡 Python, Docker, PyTorch / PyTorch Lightning

- Conceptualised and implemented an automated software vulnerability detection tool for C/C++ code focused on usability and explainability. The tool leveraged graph neural network architectures to outperform the state-of-the-art model by 104%.
- Hin, D., Kan, A., Chen, H. and Babar, M.A., 2021. LineVD: Statement-level Vulnerability Detection using Graph Neural Networks. *Under Review*.

Development of an automated pipeline for software vulnerability assessment in Java

📅 Jun 2020 – Jan 2021 | 🛡 Python, Java, Keras/Tensorflow

- Designed an automated software vulnerability assessment pipeline for Java code using deep learning, achieving 50% higher accuracy and requiring 6.3x less time to train compared to baseline models.
- Le, T.H., Hin, D., Croft, R. and Babar, M.A., 2021. DeepCVA: Automated Commit-level Vulnerability Assessment with Deep Multi-task Learning. In *Proceedings of the 36th IEEE/ACM International Conference on Automated Software Engineering (CORE A)*

Analysis and visualisation of online security vulnerability discussions

📅 Jan 2020 – Mar 2020 | 🛡 Python, SQL, Scikit-Learn, Docker

- Processed >50GB of data from StackExchange and applied topic modelling to get insights on the key types of vulnerability discussion topics being discussed by developers
- Le, T.H., Croft, R., Hin, D. and Ali Babar, M.A., 2021. A Large-scale Study of Security Vulnerability Support on Developer Q&A Websites. In *Evaluation and Assessment in Software Engineering (CORE A)*

Development of security-related text classifier from online discussions

📅 Oct 2019 – Jan 2020 | 🛡 Python, Scikit-Learn, Docker

- Used machine learning, deep learning, and natural language processing techniques to classify and interpret real-world security-related posts from StackOverflow and the StackExchange network, constructing the largest publicly-available dataset for online security-related discussions.
- Awarded \$10,000 by the Cybersecurity Cooperative Research Centre.
- Le, T.H., Hin, D., Croft, R. and Babar, M.A., 2020. PUMiner: Mining Security Posts from Developer Question and Answer Websites with PU Learning. In *2020 IEEE/ACM 17th International Conference on Mining Software Repositories (MSR). IEEE*. (CORE A).

## Summary

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I am an experienced software engineer. My projects address real-world problems across areas as diverse as software security, biology, and computer vision. They demonstrate my expertise in software development, encompassing web, mobile, and desktop-based applications. Many of these projects have been published in peer-reviewed literature, highlighting my ability to see projects to completion while working with different teams. I am seeking an opportunity where I can continually improve my engineering practices and find new ways to optimise complex tasks.

## Skills & Competencies

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### Software Development

JavaScript Node.js React

HTML CSS Git

Firebase Amazon Web Services

Google Cloud Platform

### Data Science

Pandas Scikit-learn R

Deep Learning PyTorch/Tensorflow

High-performance computing (HPC)

### Soft skills

Cross-team collaboration

Mentoring Project management

Presentation skills

## Education

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Bachelor of Engineering (Software) with First-class Honours

University of Adelaide

📅 Feb 2017 – Dec 2020 | GPA: 6.8/7

## The University of Adelaide

### Supervision of summer projects

Nov 2020 – Feb 2021 | 🔒 Python, React, Express, Node.js, Google Cloud Platform

- Conceptualised and oversaw two 12-week summer projects based on web application development, web scraping, and deployment of machine learning technologies.
- Final deliverables completed on-time and received great feedback from both the students and funder.

### Development of web application for tracking of vulnerable software components

Mar 2020 – Nov 2020 | 🔒 React, Node.js, Express, MongoDB, Google Cloud Platform, Docker, HTML5/CSS3

- Built and deployed a microservice-based backend and front-end web application for innovatively tracking and analysing vulnerable software components.
- Awarded \$10,000 by the Cybersecurity Cooperative Research Centre.
- This project achieved the highest mark for final year Honours project for Bachelor of Engineering (Software) at the University of Adelaide (2020).

### Exploration of deep style transfer in images

Dec 2018 – Jan 2019 | 🔒 Python, Matlab

- Leveraged covariance matrix adaptation evolution to transfer high-level image and style features from one image to another, using Python/Keras and Matlab.
- Work done under Adelaide Summer Research Scholarship (ASRS) program (awarded \$1,200).
- Alexander, B., **Hin, D.**, Neumann, A. and Ull-Karim, S., 2019, December. *Evolving pictures in image transition space*. In *International Conference on Neural Information Processing* (pp. 679-690). Springer, Cham. (CORE B)

## Centre for Nanoscale BioPhotonics

### Development of interactive visualisation-based application for spectroscopy analysis

Jul 2018 – Feb 2019 | 🔒 R, R Shiny

- Created an app to analyse data collected from custom built biological autofluorescence spectroscopy equipment, involving manipulation of raw signal data, unsupervised learning, and dimension reduction techniques.

## Achievements

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- 2021 - Cybersecurity CRC PhD Top-Up Scholarship
- 2020 - Lifelenz Prize, for achieving the highest Honours mark in Bachelor of Engineering (Software)
- 2020 - Cybersecurity Cooperative Research Centre Honours Scholarship
- 2020 - University of Adelaide: Executive Dean's Award for Academic Excellence
- 2019 - Cybersecurity Cooperative Research Centre Summer Scholarship
- 2018 - Australian Oracle User Group Prize, for achieving highest score in Web and Database Computing course
- 2018 - University of Adelaide: Executive Dean's Award for Academic Excellence
- 2017 - University of Adelaide: Executive Dean's Award for Academic Excellence
- 2016 - Dux of The Heights School, SA
- 2015 - Govhack: International Digital Humanities Hack, N3xGen South Australian Champion