

# ZHUO YING JIANG LI

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## EDUCATION

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**King's College London**, London, UK 09/2019 – 06/2022 (expected)

BSc Computer Science: *Information Security, Cryptography, Operating Systems, Internet Systems, Compilers, Foundations of Computing (Maths), C++ for algorithms and data structures, Optimization Methods, Artificial Intelligence*

**IES Son Pacs**, Balearic Islands, Spain 09/2017 – 06/2019

International Baccalaureate, Grade: 45/45, Extended Essay (Maths): A

## SELECTED PROJECTS

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**Regular expression matcher and lexer:** Brzozowski algorithm and Sulzmann & Lu algorithm 09/2021

- Derived and proved the correctness of the Brzozowski derivatives for extended regular expression operations
- Implemented the Brzozowski algorithm in a functional language (Scala)
- Implemented the Sulzmann & Lu algorithm as an extension for regular expression lexing (Scala)

**Userland shell:** A minimal userland shell written in Rust 09/2021 – Ongoing

- Implemented common internal commands, redirection and pipes
- Added support for background processes using threads

**Optiver volatility prediction:** Predict volatility given past trade and price series 08/2021 – 09/2021

- Implemented and compared different algorithms (decision trees and NN) in Python
- Optimized hyperparameters using Optuna
- Designed the prediction generator architecture having extensibility in mind

**Userland rootkit:** A Linux rootkit in C based on hijacking DLL 08/2021 – Ongoing

- Added support for hooking system calls using LD\_PRELOAD environment variable

**MapReduce client/server:** A MapReduce implementation in Golang 07/2021

- Implemented the MapReduce model based on the paper *MapReduce: Simplified Data Processing on Large Clusters* by Google and the MIT Distributed Systems course
- Analysed and performed experiments with OPTIC planner applied to Sokoban game
- Wrote a detailed report in  $\text{\LaTeX}$

**Blog:** Hacking and competitions writeups Ongoing

- Worked on and analysed 20+ challenges and vulnerable machines on HackTheBox and other CTFs
- Wrote walkthroughs notes about operating system internals, shells, exploits

**Algorithms implementation:** Python implementation of algorithms Ongoing

- Implemented greedy and DPLL SAT solver
- Implemented algorithm to perform topological sorting given a directed graph
- Implemented algorithm to generate a connected components graph from a directed graph
- Implemented 2-opt TSP solver, to find local minimum weighted Hamiltonian cycle in a complete graph expressed with a cost adjacency matrix
- Implemented KMeans for clustering and Hunt algorithm for building a decision tree

## EXPERIENCE

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**GIAC Hacker tools, techniques, exploits and incident handling training**, SANS Institute Remote

- Studied in detail defensive and offensive operations in internal networks

**CTF Content Creator**, SANS Institute Remote

- Designed a challenge about extracting confidential data from leaked .git directory
- Solved (mostly) reverse engineering challenges using Ghidra, x64dbg and gdb
- Attacked 15+ (mostly) Linux machines

## Student Representative

King's College London

- Co-chaired the Student Staff Liaison Committee (SSLC)
- Collected student feedback and discussed solutions with university staff
- Proposed ideas and organised events to improve the learning environment of the student community

## SnapSense (Startup)

Remote

Software Developer

03/2021

- Implemented a diabetes ulcer monitoring system using Ruby on Rails
- Deployed resources and backend server to AWS using S3, RDS and EB cloud services

Software Developer

09/2020

- Built a WeChat miniprogram for news, weather, restaurant listing, second hand exchange, events and more
- Added support for one-click event booking

## SELECTED AWARDS

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|---|------|
| • GIAC Advisory Board member (top performance)                        | 2020 |
| • Undergraduate Informatics Year 1 or Year 2 Prize (best performance) | 2020 |
| • Silver Prize, Iberoamerican Olympiad in Chemistry                   | 2019 |
| • Silver Prize, National Olympiad in Chemistry                        | 2019 |
| • Silver Prize, National Olympiad in Physics                          | 2019 |

## SKILLS

**Programming Languages:** Python, Golang, C++, C, Rust, Scala, JavaScript, Java, Ruby (ranked by proficiency)

**Tools and Frameworks:** Pytorch, Tensorflow, Docker, Ruby on Rails, Vue, React, React Native, Git,  $\LaTeX$