

# Constantin Petrescu

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## SKILLS

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**Technical Skills:** C/C++, Python, ML libraries (Keras, TensorFlow, PyTorch), Data Visualisation (Matplotlib, Plotly), Database (MySQL), DevOps (Git, Docker, AWS, GCP), Testing systems (PyTest, Nose2), Compiler (Clang, LLVM)

## WORK EXPERIENCE

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**Research and Machine Learning Engineer, Hurdle** 2024

- Developing an AI-powered Health Insights Engine for healthcare companies
- Training models to review personalised patients data for early detection of diseases

**Machine Learning Engineer, Freelance** 2024

- Trained and deployed LLM models (Llama, Mixtral) for diverse chatbot applications
- Implemented a multi-model LLM architecture, optimising app performance for specific queries
- Developed and deployed transformer models to detect hateful comments for chat moderation

**PhD Projects, University of Surrey** 2019 – 2023

- Dynamic Analysis Tool to Identify Untested functions
  - Tool that executes Python integration tests (PyTest, Nose, Tox) to identify tested and untested functions
  - Created a statistical model with 80% accuracy to identify functions that require integration testing
- Static Analysis Tool to Evaluate C++ Type Conversions
  - Created a custom compiler pass for Clang to parse C++ files and to extract type conversions
  - Developed model to evaluate security and quality of type conversions with 81% precision and 90% recall
- Static Analysis Tool to Identify Optimal Data Structures
  - Developed a C++ tool integrated with LLVM compiler to identify and rewrite optimised data types
  - Used genetic algorithms to identify the most optimal data structures or library interface optimisations
  - Improved three open-source libraries up to 16.09% CPU usage, 27.90% runtime, and 2.74% memory

**Research Intern, UCL** 2018 – 2019

- Developed an AI coding co-pilot for C/C++ using a neural network to predict multiple tokens and improve code completion; Data gathering was done through NLP by building a Clang plugin to process open-source projects

**Software Engineer Intern, Emotech** 2017

- Improved the architecture of existing scrapers to allow multiple scrapers to gather data at the same time. Increased the speed of scraping by 30x and added functionality to make it easy to run and manage

**Software Engineer, Freelance** 2017

- Developed a responsive flight tracking website using agile principles. Front-end: HTML, CSS, JS, jQuery; Back-end: Node.JS, Express.JS; Database: MySQL; Data gathering was done using a Java web crawler

## EDUCATION

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**University of Surrey, PhD Computer Science** 2019 – 2023

- Supervisor of Final Year Projects for BSc and MSc, and Research Summer Internships

**Royal Holloway, MSc Information Security** 2018 – 2019

**University College London, BSc Computer Science** 2015 – 2018

## PROJECTS

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**Smarter Code Completion – UCL final year project** 2017 – 2018

- Added a feature in code completion for TypeScript to predict external API calls using Neural Network ML model

## PUBLISHED WORK

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**Bimodal Vetting of Integration Tests.** 2023

C. C. Petrescu, S. Smith, A. Butler, R. Giavrimis, S. K. Dash. *Under review*

**Do Names Echo Semantics? A Large-Scale Study of Identifiers Used in C++'s Named Casts.** 2023

C. C. Petrescu, S. Smith, R. Giavrimis, S. K. Dash. *Journal of Systems and Software from Elsevier*

**Genetic Optimisation of C++ Applications.** 2021

R. Giavrimis, A. Butler, C. C. Petrescu, M. Basios, S. K. Dash. *ASE Late Breaking Results Track.*