ALEXANDRE BOURQUELOT

Software engineer, C++ and Python

Strong background in software development using both **C++** and **Python**.
Deeply interested in the **entire** development process and eager to learn about **new technologies**.
I want to solve **algorithmic** problems for **practical** applications.
Looking for a full-time position in **Singapore**.

+33 6 89 08 04 26 | alexandre-bourquelot
+1 609 255 0380 | github.com/elrandar
Princeton, NJ, USA | bourquelot.dev

alexandre.bourquelot@gmail.com
French citizenship, Eligible for sponsorship (EP)

PROFESSIONAL EXPERIENCE

Machine Learning Research Intern — Feb 2022 – Feb 2023
Siemens Healthineers *(Global leader in healthcare)* — *Princeton, NJ, USA*

- Full-time intern in cardiac research group at Siemens innovation center. Translated clinical data and challenges into AI solutions. Originally planned for 6 months, extended for another 6 months as a result of work achieved during initial period.
- **Image processing**: Improved deep learning algorithms for segmentation (↗ 15%), classification (↗ 17%) and landmark detection (↗ 24%) in cardiac MRI images. Experimented in **PyTorch** and **Python** and converted the model to in-house deep learning framework in **C++**. **Delivered** model for use by a major hospital group in Europe.
- **Research**: Conducted research in semi-supervised learning for segmentation in cardiac MRI images. Aiming to reduce the cost of data annotation while delivering similar results. Proposed method reaches **same accuracy** as baseline, using **50% less** annotated data. Accepted at SCMR 2023.
- **Data Engineering**: Developed data processing pipelines for medical data in Python. Focused on code maintainability.

Graduate Research Student — Feb 2021 – Feb 2022
LRDE *(EPITA Research Laboratory, expertise in image processing and pattern recognition)* — *Paris, France*

- Part time lab member during my studies at EPITA. Supervised by Dr. Joseph Chazalon, Dr. Edwin Carlinet.
- **Pattern recognition**: Implemented a novel method for **line detection** in **document images** using tracking via **Kalman filter**. Method maintains high accuracy on challenging inputs, is 3% faster on average than SotA non-Deep Learning methods. Prototyped in **Python** and implemented efficiently in **C++**, as part of the Pylene library. Conducted weekly progress updates.
- **Publication**: Paper submitted to ICDAR 2023.

C++ Software Engineering Intern — Sep 2020 – Feb 2021
Soletanche Bachy *(World leader in foundation and soil technologies ≈ 10,000 employees)* — *Paris, France*

- **Messaging tool**: Delivered features for new generation of construction machine. Implemented a **data exchange** framework to remotely monitor real-time construction site progress, using **WebSockets** and **REST** calls, along with **OAuth2** and **OpenID** connect security. Programmed power outage detection and prevention measures.
  New features were rolled out to a fleet of **30** machines that were scattered across various countries around the world.
- **Synchronization tool**: Rewrote tool responsible for synchronizing site files between construction machine and site manager. **Improved speed** by 100% and reliability of synchronization. Used **Qt** library. Used **OOP** paradigm to facilitate future updates.
- **Site assistance**: Provided on-site assistance at a Monaco construction site. Updated the machine software and collected feedback.

EDUCATION

École pour l'informatique et les techniques avancées (EPITA) *(Ranked 6th in France for computer science)* — Sep 2017 – Aug 2022
MSc in Computer Science and Machine Learning — *Paris, France*
Some courses : Deep learning, Image processing, Optimization, Object Recognition, Computer Vision

Griffith College Cork — Jan 2019 – May 2019
Undergraduate Exchange Student Android development, operating systems courses — *Cork, Ireland*

SKILLS

TECHNICAL		LANGUAGES	
Programming	Python, C++, C, C#, CUDA, Java	**English**	Fluent (TOEIC 985/990)
Libraries	PyTorch, TensorFlow, OpenCV, Scikit-Learn	**French**	Native
Additional	Unity, Docker, Git, Linux, Hugging Face	**Japanese**	Conversational
Web	HTML, CSS, JavaScript, HUGO	**Spanish**	Basic

PROJECTS

Cycle GAN Ukiyo-e *python, pytorch* Implemented the Cycle GAN architecture to turn photographs into Japanese prints (Ukiyo-e). Development of a demo website backed up by HTML and a flask server. Code

Raytracer *c++* A Raytracer built from scratch in **C++**. Able to generate simple scenes with complex **lighting**. Features **terrain**, **grass**, and **tree** model generation using L-system grammar. Code

Map line detection *cuda* A **CUDA** implementation of the document line detection method prototyped during my part-time research student time. Able to utilize parallelism to outspeed C++ implementation, at the cost of no heuristics. Code

Chess Engine *c++* Built a **chess engine** and **AI** in **C++**, from scratch. Placed second out of 100 participants at school competition. The engine uses of a classical **minimax** algorithm, making use of speedup features such as **alpha-beta pruning**. Code

42-sh *c* Working POSIX shell (.sh interpreter) coded from scratch in **C**. Developed following **test-driven development** principles (TDD). Test suite scripted in **Python** with Yaml configuration file.

INTERESTS

AI News | AR / VR | Healthcare | Semiconductors

HOBBIES

Rock climbing | Hiking | Cooking | Learning languages