

# Ryan Teo

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## Experience

### Security Operations Center Analyst @ Housing & Development Board

SEP 2020 – FEB 2021

- Monitored **domain fraud** and collected **cyber threat intelligence** daily to support **proactive security measures**.
- Designed and implemented an **automated threat intelligence collection pipeline** using **Python**, improving threat intelligence data coverage and reducing manual tracking effort.
- Refactored and automated the **domain fraud detection** system, reducing analyst review time and false positives.
- Wrote a user guide to support onboarding and usage of the new system.

## Projects

### Interactive 3D Portfolio Website

- Developed a virtual 3D workspace experience using **React Three Fiber** and custom **GLSL shaders**.
- Particle effects with Perlin noise and optimized performance via texture baking and GLTF model loading.
- Built with **TypeScript** and **React** for modular, type-safe component architecture and interactive UI elements.

### WebGL Dissolve Shader

- Built a real-time dissolve/disintegration **WebGL shader** using **GLSL** and React Three Fiber.
- Implemented **procedural noise-based animations** with live parameter controls and **post-processing** integration.
- Applied advanced WebGL techniques, including **custom shader injection**, shadow mapping, and GPU-accelerated rendering.

### Real-Time Audio Visualizer with WebGL

- Built a web app that captures live microphone input and renders synchronized audio visualizations in real-time.
- Implemented dynamic spectrum analyzers, waveforms, and a **3D WebGL scene** using custom **GLSL** shaders.
- Processed audio in both frequency and time domains with the Web Audio API, supporting Canvas 2D and WebGL rendering.

### Personal Portfolio 2023

- Built a modern portfolio site in **JavaScript**, featuring a lightweight 3D scene using **Three.js** and animations with GSAP.
- Created custom **GLSL** shaders for particle effects and modularized the codebase using front-end design patterns.
- Demonstrates **front-end web dev** skills, **3D graphics programming**, performance optimization, and usage of **modern build tools**.

### ArXiv Semantic Search Engine

- Built a **lightweight semantic search engine** for academic papers using core **RAG** components.
- Designed **ETL pipeline**: collected data via ArXiv API, **preprocessed** abstracts, and generated **SentenceTransformer embeddings**.
- Persistent **vector storage** with **ChromaDB** and implemented **similarity search** for **natural language queries** via interactive CLI.
- Applied **NLP** techniques, **vector database** management, and **pipeline engineering** for scalable semantic retrieval.
- Demonstrated real-world use of **Retrieval-Augmented Generation** in research discovery.

### FabLab Adventures

- Created a 2D game from scratch using Python's Turtle library, with **real-time collision detection** and **dynamic difficulty scaling**.
- Applied **object-oriented design** with object manager classes and a **custom physics** loop for **clean, modular architecture**.
- Demonstrates advanced **Python** programming, game development fundamentals, and **clean code practices**.

## Education

### Bachelor of Engineering, Computer Science @ Singapore University of Technology and Design (SUTD)

SEP 2023 – APR 2027

- 3.95 GPA

## Skills

**Languages:** JavaScript, TypeScript, Python, Java, C#, SQL

**Web:** React, Node.js, Vite, ESLint, WebGL, Three.js

**Other:** Git, GitHub Actions, PostgreSQL, MySQL

**Concepts:** RESTful APIs, CI/CD, Agile Development, OOP, Functional Programming