Felipe Augusto Bonchristiano

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Citizenship: United Kingdom, Italy (EU), Brazil

Education

University of Illinois Urbana-Champaign — Champaign, IL
B.S. in Computer Science and Bioengineering — *Aug 2025 – May 2029*
- Concentration: AI/ML for Computational Biology (genomics, protein modeling, generative protein design)
- Relevant coursework: Data Structures, Discrete Math, Molecular and Cellular Biology

Abingdon School — Abingdon, UK
A-Levels in Further Maths, Mathematics, Computer Science, Chemistry (A, A, A, A)* — *Sep 2020 – Jul 2025*
- SAT: 1540 (790 Math, 750 English)

Experience

CortexCodec (15-student research team under NeuroTech@UIUC) — Champaign, IL
Student Research Engineer — *Sep 2025 – Present*
- Co-developing a Python system that classifies brainwaves into real-time emotion predictions
- Leading design of EEG data collection, preprocessing (band-pass/notch/ICA) for clean signals and feature extraction
- Training scikit-learn/PyTorch models with cross-subject validation

Vyttra Diagnostics — São Paulo, Brazil
Software Engineering Intern — *Jun 2024 – Jul 2024*
- Spearheaded project to transform lab instrument data (Python/Pandas) into a SQLite database
- Implemented schema and validation to flag equipment anomalies and create QC audit logs
- Shipped a Streamlit + Plotly dashboard for sample throughput, turnaround time, and QC alerts
- Automated daily refresh and PDF reports via a CLI and Windows Task Scheduler

Summertown CP Warriors (nonprofit) — Abingdon, UK
Coach & Program Coordinator — *Sep 2022 – May 2025*
- Coached a soccer team for 15 children (ages 4–13) with mobility disabilities; managed 4 volunteers
- Led a Paris–Geneva bike ride fundraiser ($2000+), financing new accessible equipment

Honors

- Gold, UKMT Senior Mathematical Challenge (2024)
- Chemistry: Gold, Cambridge Chemistry Challenge (2024) | Silver, UK Chemistry Olympiad (2025)
- Blacknall Academic Scholarship, Abingdon School (2020 – 2025)

Projects

Genomic Snippet Search Engine (K-mer indexing):
- Building a C++ k-mer index (minimizers + FM-index) with compressed bitmaps for fast presence/count queries
- Implementing memory-mapped, cache-aware search with Bloom/Cuckoo filters and a clean CLI
- Benchmarking on GB-scale FASTA/FASTQ with golden tests and reproducible runs

Protein Function Classification with ESM-2 Fine-Tuning (Gene Ontology):
- Built FASTA preprocessing pipeline with deterministic splits and GO vectors for 150k+ proteins
- Implemented CLS embedding extraction (ESM-2 650M; PyTorch + Transformers) and self-supervised MLM adaptation
- Tuned MLP + LoRA (Optuna, W&B) to strong balanced-F1 across hundreds of CAFA-5 terms

Real-Time 3D Fractal Generator and Explorer (Ray Marched SDFs):
- Implemented signed-distance-field ray marching in C++ with sphere tracing and normal estimation for 3D fractals.
- Modularized the rendering pipeline: parameterized distance estimators and swappable lighting models at runtime
- Optimized render loop (BV culling, adaptive steps, early-exit) and added a UI for real-time fractal tuning

Skills

Languages: Python, C++, SQL, TypeScript, JavaScript, GLSL
Technologies: Linux, PyTorch, OpenGL, React.js, Node.js, Docker, Git, LaTeX
Fluency: English (Native), Portuguese (Native), Spanish (Conversational), Mandarin Chinese (HSK 4 cert.)