Felipe Augusto Bonchristiano

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Education

University of Illinois Urbana-Champaign — Champaign, IL

B.S. in Computer Science and Bioengineering — *Aug 2025 – May 2029*

- Intended focus: 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 Mathematics, Mathematics, Computer Science, Chemistry (A, A, A, A)* — *Sep 2020 – Jul 2025*

- Blacknall Academic Scholarship Winner (2021).
- 8.6/9.0 GCSE grade average.

Experience

CortexCodec (NeuroTech @ UIUC) — Champaign, IL

Technical Team Member — *Sep 2025 – Present*

- Building EEG emotion classification; preprocessing (band-pass/notch/ICA) and feature extraction for robust signals.
- Training scikit-learn/PyTorch models with cross-subject validation, optimizing near-real-time inference.
- Co-designing data collection/labels and a lightweight live-predictions dashboard.

Vyttra Diagnósticos — São Paulo, Brazil

Software Engineering Intern — *Jun 2024 – Jul 2024*

- Built Python ETL to ingest instrument CSVs into indexed SQLite tables.
- Implemented schema + validation to flag 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 (local press), financing new accessible equipment.

Projects

Compressed Genomic K-mer Search Engine:

- 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.

ESM-2 Fine-Tuning for Protein Function Classification (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.

3D Fractal Generator (Real-Time Ray Marcher):

- 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.)