

Stefan Ritchie *Bioinformatician*

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🐙 github.com/stef1949 🔗 Translational Oncology Collaborator (UCL/CRUK)

👤 Profile

Bioinformatician (MSc Genetic Manipulation & Molecular Biosciences) with expertise in RNA-seq analysis, statistical genetics, and GPU-accelerated workflows. Skilled in building reproducible pipelines (R, Nextflow, Docker, HPC, GCP) and advanced ML approaches (adversarial autoencoders, neural networks) for genomics. Proven track record of translational oncology collaborations (UCL, Cancer Research UK) and entrepreneurial innovation (Richies 3D Ltd). Strong technical foundation in Python, R, C++, and CUDA, with applied experience bridging computational biology and wearable biotech solutions.

📁 Professional Experience

2024 – 2025
Brighton

Bioinformatics Research Project (MSc Research Project), University of Sussex

- Designed **RNA-seq simulation pipelines** to evaluate 10+ batch correction methods (ComBat, Harmony, fastMNN, RUVg).
- Implemented numerous reproducible workflows in R and Nextflow and containerised environments.
- Applied evaluation metrics (PERMANOVA R^2 , kBET, iLISI/cLISI, silhouette analysis) with results informed oncology pipelines at UCL/CRUK.
- Delivered high-impact visualisations (PCA plots, clustering metrics) used in translational oncology contexts.
- Collaborated with **UCL & Cancer Research UK**, aligning results with translational oncology.

2023 – Present
Brighton

Director & Founder, Richies 3D Ltd

- Established additive manufacturing business tech-driven SME, applying CAD and rapid prototyping to molecular models for education and research and wearable technologies.
- Developed **LumiFur** (SwiftUI, ESP32, BLE, C++), integrating accelerometer input and OTA updates for LED matrix displays.
- Partnered with universities for scientific model production among various departments across the country.
- Managed international clients, delivering 100+ orders annually with 30% efficiency gains..

10/2021 – 11/2023
Brighton, United Kingdom

Dispensing Assistant, Kamsons Pharmacy

- Strengthened regulatory compliance, SOP adherence, and clinical data management – directly transferable to regulated bioinformatics pipelines (ISO/UKAS environments).

🎓 Education

09/2024 – 09/2025
Brighton

MSc Genetic Manipulation & Molecular Biosciences, University of Sussex

- Focus: Genetic engineering, bioinformatics pipelines, statistical genetics, and rare disease genomics.
- Skills developed: PERMANOVA R^2 , kBET, iLISI/cLISI, silhouette analysis, GWAS, meta-analysis, workflow reproducibility.

2019 – 09/2024
Brighton

BSc Biomedical Sciences, University of Brighton

- Generated homology models of drSERTaa using **SWISS-MODEL** and validated against **AlphaFold** predictions.
- Conducted **930 ns molecular dynamics simulations** with NAMD (CUDA-accelerated) applying CHARMM36 forcefields and TIP3P solvation models.
- Quantified **binding free energy (ΔG_{bind})** of sertraline-drSERTaa complexes (–11.56 kcal/mol) vs. human hSERT (–8.9 kcal/mol), revealing stronger but less stable binding in zebrafish.
- Applied **RMSD analysis** (1.5–2.4Å range) and identified novel binding site residues, providing a framework for **toxicological risk assessment** of SSRIs in aquatic systems.
- Produced high-quality **3D structural visualisations** using Blender (GPU-accelerated OptiX shaders) and PoseView for protein-ligand interaction mapping.
- Highlighted implications for **environmental toxicology** and wastewater management in SSRIs contamination.

09/2017 – 04/2019
Rochester

A-Levels, Rochester Grammar School for Girls Biology, Chemistry, Mathematics, EPQ

09/2012 – 08/2017
Rochester

GCSE, Sir Joseph Williamson's Mathematical School A*/A grades in Sciences, Computing, Mathematics, English, Geography, DT

Skills

RNA-seq analysis

C++

C

SPSS

Molecular Dynamics & Structural Bioinformatics

NAMD, GROMACS, CHARMM36, TIP3P, RMSD, binding free energy, Ramachandran plots.

Swift UI

LumiFur App built using a cross-platform architecture for iOS, MacOS, WatchOS & iPadOS

Google Cloud Compute

CUDA

Molecular dynamics

Protein-Ligand Complexes

Protein Modelling &

Docking

SWISS-MODEL, AlphaFold, ChimeraX, SwissDock, PoseView.

R

Docker

YAML

Neural Network

Computational Toxicology

Predictive modelling of SSRI impacts on aquatic species, environmental bioinformatics.

Python

CSS

Bash

Adversarial Autoencoders

HarmonizeNN

HPC & GPU Acceleration

CUDA-accelerated MD simulations (NAMD, VMD, QwikMD), parallel workflow optimisation.

Projects


2024 – 09/2025

RNA-seq Batch Correction Benchmarking, MSc Research (UCL & Cancer Research UK)

- Designed and executed pipelines to **simulate bulk RNA-seq datasets** (SPsimSeq, SimBu).
- Delivered reproducible R pipelines now used by peers implementing machine learning, surrogate and empirical methods, along with diagnostic outputs.

08/2025 – Present

HarmonizeNN, Deep Learning Adversarial Autoencoder for Batch Correction

GitHub: [stef1949/HarmonizeNN](#) 

- Developed a **deep learning framework** integrating **auto-encoders and adversarial training** to remove confounders while preserving biological signal for RNA-seq correction.
- Produced corrected logCPM matrices and latent embeddings along with diagnostic metrics (PCA, silhouette, kBET).
- Fully CUDA accelerated pipeline

2019 – 2023

Molecular Dynamics Dissertation, University of Brighton

- Conducted **molecular dynamics simulations** using homology modelling and molecular dynamics simulations with NAMD to investigate protein-ligand free-energy binding potentials between *danio rerio* drSERTaa-Sertraline complexes.
- Identified binding hot spots and conformational instabilities with **clinical and ecological relevance**.
- Analysed **protein-ligand interactions** to explore drug targeting strategies in cancer biology.
- Developed transferable skills in **HPC use, protein modelling, and reproducible analysis pipelines**.
- Showcased ability to design **end-to-end computational pipelines**: sequence retrieval → homology modelling → docking → MD simulation → free energy/RMSD analysis → visualisation.

Awards

04/09/2000

Spirit of Sussex Gold Award, Spirit of Sussex

Recognised for outstanding contribution to university life through academic excellence, community engagement, and cross-disciplinary entrepreneurial innovation.

2018

Duke of Edinburgh's Gold Award, DofE

Volunteering, skills, and leadership development.

DofE ID no.919064

Certificates

GPhC Pharmacy Assistant

NVQ Level 2 accreditation covering prescription processing, pharmaceutical stock management, assembling prescribed items, advising on non-prescribed medicines, and supporting pharmacy services in a clinical setting.

Essential First Aid

St. John's Ambulance basic first aid certified

Languages

English
