# Ferran Cardoso Rodriguez

Curriculum Vitae

## SELECTED OUTPUTS

PUBLICATION
**Cardoso Rodriguez & Qin et al., 2023**
A SINGLE-CELL PERTURBATION LANDSCAPE OF COLONIC STEM CELL POLARISATION
*DOI: BioRxiv (in revision at Cell)*

PACKAGE
**FerranC96/pyKrack**
COMPUTING KRACKHARDT HIERARCHY SCORE ON DIRECTED GRAPHS
*PyPI: pykrack*

PIPELINE
**TAPE-Lab/CyGNAL**
CYTOF SIGNALLING ANALYSIS (CYGNAL) PIPELINE
*DOI: Zenodo*

## RELEVANT EXPERIENCE

SEPT. 2019 – PRESENT

UCL, PhD Thesis
*Single-Cell Omic Analysis* –(Misc.)

Using novel computational approaches to study **CRC organoids** and the **TME** through single-cell *omics*.

*UCL-Yale Collab* –(Python)                    Collaboration
Orchestrated an on-site **collaboration** between UCL and **Yale** aiming to characterise cellular **communications** using **graph-based** approaches. Blog entry ⊕

*VRland* –(Python)                    Method Development
Valley-Ridge score to generate data-driven **Waddington**-like **landscapes** of cellular **plasticity** and **differentiation** from **scRNA-seq** data. Project repository ○
Publication: Cardoso Rodriguez & Qin et al. 2023 📄

*CyGNAL* –(Python/R)                    Analysis Pipeline
**Pipeline** for the **analysis** and interactive **visualisation** of **mass cytometry** data via PTM signalling and cell-state classification via ensemble MLS. Project repository ○
Publication: Sufi & Qin et al. 2021 📄

### MSc Computational Projects

Imperial, MSc Project 3                    Jun. – Sept. 2019
*AnnoRE pipeline* –(Python/R)
**Pipeline** for downstream annotation of **genetic variants** and metabolomics high-throughput data to study **complex trait** diseases. Project repository ○

Imperial, MSc Project 2                    Apr. – Jun. 2019
*scRNAseq data analysis* –(R)
Analysis of **scRNA-seq** datasets to characterise **cardiac** development. Web report ⊕

Imperial, MSc Project 1                    Jan. – Apr. 2019
*FBA Flask app back-end* –(Python)
Group project developing MetEOr, an **online tool** for visualising and performing **Flux Balance Analysis** on whole-organism **metabolic models**. Project repository ○

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## EDUCATION

2019 – 2023(EST)
**PhD Computational Biology**
UNIVERSITY COLLEGE LONDON
*PhD programme at Dr. Chris Tape's lab (UCL Cancer Institute).*

2022
**UCL-Yale PhD Exchange**
*Collaborative exchange at Prof. Smita Krishnaswamy's lab (YSM/SEAS Yale University).*

2018 – 2019
**MSc Bioinformatics and Theoretical Systems Biology**
IMPERIAL COLLEGE LONDON
*Multi-project programme.*

2014 – 2018
**BSc Biotechnology**
UNIVERSITAT DE BARCELONA
*Erasmus at WHRI (QMUL).*

## SKILLS

COMMUNITY
**Collaboration** both within and outside research group.
**Volunteering** at public engagement events.
**Teaching** tutorials for BSc students and ESL teaching experience.
**Public speaking** at international events.
**FAIR** and **FOSS** advocate.

TECHNICAL
**Languages**: Proficiency in Python and R. LaTeX, Markdown, web technologies.
**Reporting**: Publication-grade figures, interactive visualisations.
**Workflows**: Remote computing in HPC, nextflow pipelines, containerisation.

DATA ANALYSIS
**Pipelines**: BCL to FASTQ, custom transcriptome references, sequence alignment.
**scOmic data**: Dim. reduction, clustering, dif. expression, compositional analysis, cell-cell communications, cellular dynamics, data integration.
**ML applications**: Knowledge-graph embedding, graph signal processing, classification models, PyTorch.

DEVELOPMENT
**Team Projects**: Version control and collaboration through git.
**Build and deployment**: Multi-language tools, interactive reports, PyPI and conda packaging, nbdev for notebook-centric development, container deployment.