

CURRICULUM VITAE

RUTH NANJALA

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PROFESSIONAL SUMMARY

Bioinformatician and D.Phil. student at the University of Oxford with expertise in statistical genetics, genomics, large-scale biobank analysis, and robust computational pipelines. Experienced in developing scalable workflows using Python, Nextflow, and Snakemake for genomics and transcriptomics analyses across diverse populations. Proven track record collaborating across multidisciplinary international teams, with research experience at Oxford, Harvard Medical School, and African genomics consortia. Passionate about applying bioinformatics and machine learning approaches to solve complex biomedical and global health challenges.

EDUCATIONAL BACKGROUND

- Oct 2022 – Sep 2026 University of Oxford**
D.Phil. in Molecular and Cellular Medicine
Supervisors: Dr. Yang Luo and Prof. John Todd
College advisor: Prof. Teresa Lambe
- Sep 2019 – Oct 2021 Pwani University, Kenya & University of Cape Town, South Africa**
M.Sc. Bioinformatics – Distinction
Supervisors: Prof. Nicola Mulder, Mr Mamana Mbiyavanga, Prof. Santie de Villiers, Prof. Suhaila Hashim
- Aug 2015 - May 2019 Pwani University, Kenya**
BSc. Microbiology – First Class Honours
Supervisor: Dr. Simon Muriu

TECHNICAL SKILLS

Programming and Scripting: Python, R, Bash

Workflow Management: Nextflow, Snakemake

Bioinformatics and Genomics: Statistical genetics, GWAS, MHC analysis, genotype imputation, RNA-seq analysis, polygenic risk scores, genome-wide association studies, gene expression analysis, genomics data processing

Machine Learning and Data Science: Predictive modelling, feature engineering using multiomics data, statistical modelling, large-scale data analysis

Cloud, HPC and Reproducibility: Slurm, DNANexus, Git and GitHub, robust workflows, scalable computational pipelines

Data types: Genomics, transcriptomics, population genetics, biobank-scale datasets

Data analysis & visualization: Pandas, NumPy, Matplotlib, statistical analysis workflows

RESEARCH EXPERIENCE

Oct 2022 – Sep 2026

Kennedy Institute of Rheumatology, University of Oxford
D.Phil.

Thesis title: *HLA* inference, diversity and association with complex traits in global populations

- Develop scalable bioinformatics and statistical genetics pipelines to analyse complex HLA diversity and immune-associated traits across multiple international biobank-scale datasets including UK Biobank, China Kadoorie Biobank, Mexico City Prospective Study, and NeuroGAP.
- Build robust genomics workflows for HLA typing, association testing, and phenotype-wide analyses using Python-based pipelines and high-performance computing environments.
- Apply statistical genetics and computational biology approaches to understand the role of HLA variation in complex immune-mediated diseases.
- Collaborate across multidisciplinary international teams to translate complex genomic analyses into biologically meaningful insights.
- Contribute to open-source computational tools and robust research practices.

Selected GitHub Projects:

- HLA Diversity: <https://github.com/yang-luo-lab/HLADiversity/tree/main>
- HLA Typing Pipeline: https://github.com/nanjalaruth/hla_typing_using_HLA-LA
- HLA PheWAS Pipeline: <https://github.com/nanjalaruth/HLA-PheWAS-SAIGE>

April 2024 – May 2024

Harvard Medical School, Harvard University – Boston, USA
Research Project

Supervisor: Dr. Tinashe Chikowore

- Applied data science and statistical genomics approaches to evaluate the transferability of blood cell trait polygenic risk scores for disease prediction in African populations.
- Built robust Nextflow pipelines for genomic analyses and large-scale data processing.
- Worked with population-scale datasets to improve understanding of predictive genetic modelling across ancestries.

Project links:

- Quarto website: https://nanje.quarto.pub/intergrated_prs/

- PRS Analysis Nextflow Pipeline:
<https://github.com/nanjalaruth/PRS-Analysis-Nextflow-Pipeline>

Sep 2020 - Oct 2021

**Computational Biology division, University of Cape Town
M.Sc.**

- Evaluated genotype imputation accuracy in the MHC region using African genomic datasets.
- Performed statistical analyses and benchmarking of imputation approaches for population genetics applications.
- Developed robust computational workflows and analysis pipelines for large-scale genomics datasets.

GitHub Project:

- MHC Imputation Accuracy:
<https://github.com/nanjalaruth/MHC-Imputation-Accuracy>

Jul - Aug 2020

**Eastern Africa Network for Bioinformatics Training
Bioinformatics Training Project**

- Designed and implemented a robust Snakemake workflow for RNA-seq and gene expression analysis.
- Applied best practices in workflow reproducibility, pipeline optimization, and collaborative software development.

GitHub Project:

- RNA-seq Workflow: https://github.com/nanjalaruth/Group-5-miniproject_RNASEQ

Sep 2018 - May 2019

**Pwani University (Kenya) and KEMRI Wellcome Trust (Kilifi, Kenya)
Undergraduate Research Project**

- Investigated entomological indices associated with malaria transmission in Taveta Sub-County, Kenya.
- Conducted molecular biology and epidemiological analyses to understand malaria transmission dynamics.

Jul 2018 - Sep 2018

**International Centre of Insect Physiology and Ecology (*icipe*), Kenya
Intern, Molecular Biology and Bioinformatics Unit**

- Assisted with molecular biology experiments and bioinformatics analyses within infectious disease research projects.

PROFESSIONAL EXPERIENCE

- Feb 2024 – To date** **Africa Oxford Initiative (AfOx), University of Oxford**
Students Facilitator
- Support the design and delivery of the AfOx Scholarship Programme.
 - Coordinate scholar engagement activities, events, communications, and alumni initiatives.
 - Collaborate with stakeholders to support student experience and programme development.
- Dec 2023 – Apr 2024** **Software Sustainability Institute**
Research Partner - Inclusive Research Software Engineering Project
- Contributed to initiatives focused on inclusive and sustainable research software engineering practices.
 - Collaborated on strategies to improve accessibility and diversity within computational research environments.
- Mar 2023 – Present** **Wellcome Connecting Science Learning and Training**
Course Developer and Trainer – Bioinformatics for Biologists II
- Develop and deliver training materials focused on genomics data analysis and interpretation.
 - Teach practical bioinformatics skills for analysing large-scale genomics datasets.
- Course Link:
<https://www.futurelearn.com/courses/bioinformatics-for-biologists-analysing-and-interpreting-genomics-datasets>
- Oct 2021 – Sep 2022** **International Centre for Insect Physiology and Ecology (ICIPE), Kenya**
Junior Bioinformatician, Programme Manager and Bioinformatics Instructor
- Led bioinformatics training initiatives and mentorship programmes for early-career scientists.
 - Designed course curricula and coordinated bioinformatics internship programmes.
 - Taught practical genomics and computational biology skills including robust workflows and sequencing analysis.
 - Managed collaborative scientific training projects across multiple institutions.
- Aug 2021 – To date** **The Carpentries**
Carpentries instructor
- Deliver training workshops on computational and bioinformatics skills including robust research practices and coding.
- July 2022** **Eastern Africa Network for Bioinformatics' Training (EANBiT)**

Bioinformatics instructor

- Delivered intensive residential bioinformatics training courses focused on genomics and data analysis workflows.

2021 -2022

Pan African Bioinformatics Network and Wellcome Connecting Science Next Generation Sequencing Course

Bioinformatics teaching assistant

- Supported training in next-generation sequencing analysis and practical bioinformatics workflows.

LEADERSHIP AND COMMUNITY ENGAGEMENT

Nov 2022 – To date

Founder, My Science Journey

- Founded and lead a platform supporting African scientists through mentorship, webinars, and professional development initiatives.
- Organize scientific workshops, speaker sessions, and community engagement activities.

Website: <https://mysciencejourney.com>

June 2023 – June 2024

Oxford University Africa Society Vice President

- Led initiatives supporting African students and fostering academic collaboration across Oxford.

Nov 2023 – June 2024

Oxford Africa conference 2024 Convenor

- Coordinated conference organization, sponsorship, speaker engagement, and event logistics.

Website link: <https://www.oxforduniversityafricasociety.com/oxford-africa-conference2024>

Oct 2023 – June 2024

Oxford Africa Society/ Africa Oxford Initiative mentorship scheme Program lead

- Led mentorship programme development, mentor/mentee selection, and fundraising initiatives.

Nov 2023 – Present

Kenya High Commission UK Student Representative

FELLOWSHIP AND AWARDS

- Mastercard Foundation Scholars Entrepreneurship Fund (2026)
- Public Engagement with Research Innovation Fund, Reuben College, University of Oxford (2026)
- Sir Cyril Taylor Young African Leaders Award, AFS Intercultural Programs (2025)
- Mentorship Impact Award, JR Biotek Foundation (2025)
- SDG Impact Lab Fellow, University of Oxford (2025)

- Global Leadership Challenge Fellow, University of St Gallen & University of Oxford (2024)
- Inaugural Vice Chancellor's Award Shortlist, University of Oxford (2024)
- Amplify Travel Grantee, Black Women in Computational Biology Network (2024)
- Leader of Tomorrow, 52nd St Gallen Symposium (2023)
- Clarendon Award & Kennedy Trust for Rheumatology Research PhD Scholarship, University of Oxford (2022)
- Best Presenter Award, 19th H3Africa Consortium Meeting (2022)
- Best Presenter Award, 17th H3Africa Consortium Meeting (2021)
- EANBiT Master's Scholarship (2019–2021)

PUBLICATIONS

1. **Nanjala R**, Torres J, Baca P, Tapia-Conyer R, Kurí PA, Alegre-Díaz J, Berumen J, Luo Y. HLA inference, diversity and selection analysis in Mexico. Manuscript in preparation.
2. **Nanjala R**, Ng E, Morris S, Millwood IY, Butler-Laporte G, Yang K, Li Y, Yao P, Mentzer AJ, Todd JA, Walters RG, Luo Y. Quantifying HLA diversity and phenome-wide HLA association landscape of 100,000 China Kadoorie Biobank participants. Manuscript in preparation.
3. Butler-Laporte G, Lu T, Morris S, Zhang W, Band G, Hamilton F, Chong A, Lin K, **Nanjala R**, Richards JB, Lee MH, Yang L, Yao P, Li L, Chen Z, Luo Y, Millwood IY, Walters RG, Mentzer AJ. An accurate genetic colocalisation method for the HLA locus. *HLA*. 2026;107(5):e70759. doi:10.1111/tan.70759.
4. Luka MM, **Nanjala R**, Rashed WM, *et al.* rhinotypeR enables robust rhinovirus genotype assignment from VP4/2 sequences. *Sci Rep*. 2026;16:6149. doi:10.1038/s41598-026-37050-8.
5. rhinotypeR: Rhinovirus genotyping. Bioconductor. Available from: <https://bioconductor.org/packages/rhinotypeR>. doi:10.18129/B9.bioc.rhinotypeR.
6. Deutsch AJ, Bell AS, Michalek DA, Burkholder AB, Nam S, Kreienkamp RJ, Sharp SA, Huerta-Chagoya A, Mandla R, **Nanjala R**, Luo Y, Oram RA, Florez JC, Onengut-Gumuscu S, Rich SS, Ng MCY, Motsinger-Reif AA, Manning AK, Mercader J, Udler MS. Development and validation of a type 1 diabetes multi-ancestry polygenic score. *Diabetes*. 2026;75(1):205-214. doi:10.2337/db25-0772.
7. **Nanjala R**, Mbiyavanga M, Hashim S, de Villiers S, Mulder N. Assessing HLA imputation accuracy in a West African population. *PLoS One*. 2023;18(9):e0291437. doi:10.1371/journal.pone.0291437.
8. **Nanjala R**, Nyasimi F, Masiga D, Kibet CK. A mentorship and incubation program using project-based learning to build a professional bioinformatics pipeline in Kenya. *PLoS Comput Biol*. 2023;19(3):e1010904. doi:10.1371/journal.pcbi.1010904.