

Sanjay Curtis Nagi

MRC CASE PhD student

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About

I am a post-doc at the Liverpool School of Tropical Medicine, having recently completed my PhD on the genomic surveillance of *Anopheles gambiae*. My research sits at the interface of population genomics, bioinformatics and molecular biology, and the rapid evolution and spread of insecticide resistance is of major interest. I enjoy developing software to empower other scientists to perform their own advanced and reproducible research. I am a highly motivated, enthusiastic and independent learner, and believe in a culture of continuous improvement and learning. I feel strongly about reproducibility in computational research, and use workflow managers for computational analyses.

Education

PhD. Vector biology

Liverpool School of Tropical Medicine

📅 Oct 2019 – April 2023

- Genomic surveillance of the African malaria mosquito, *Anopheles gambiae*

MRes. Quantitative skills in Global Health

Lancaster University

📅 Sept 2018 – Sept 2019

📊 Distinction | 74%

- Studied statistics and statistical genetics
- Built gene regulatory networks (GRNs) from transcriptomic data in *Anopheles gambiae* s.l
- Applied machine learning algorithms to genomic data to uncover genotype-phenotype associations
- Performed fieldwork in Chikwawa, Malawi, investigating patterns of insecticide resistance

MSc. Molecular Biology of Parasites & Disease Vectors

Liverpool School of Tropical Medicine

📅 Sept 2016 – Sept 2017

📊 Distinction | 77%

- Mechanisms of resistance to the volatile pyrethroid, transfluthrin, in mosquitoes

Experience

Data Scientist Internship

Illumina

📅 July 2021 – Oct 2021

- Building **automated software** to perform **value stream mapping** on the Illumina sequencing service, **identifying waste** and **delays** which were to be prioritised to **improve efficiency** and reduce turnaround times

Selected Awards



MRC CASE studentship

£125,000



InfraVec

Investigating the role of small RNAs in insecticide resistance in *Anopheles gambiae* | £11000



RNA transcriptomics 2019

MRC funding to attend training | £1220



Evomics Pop Gen

MRC funding to attend training | £2000

Skills

Programming languages

Python & R
Snakemake
React/NextJS

Software skills

LaTeX, MS Office
Git, Github
Continuous integration (CI) and unit tests

Numpy, Numba, Pandas
DataViz - Mpl, Bokeh, Plotly
Supervised learning - regression, GLMs, decision trees
Unsupervised learning - PCA, K-means
Geospatial methods

Molecular biology

Illumina sequencing
Amplicon sequencing panel design
qPCR & LNA probe qPCR assay design
Metabolism assays & HPLC
Cloning & Sequencing

Molecular biology research technician

Liverpool School of Tropical Medicine

📅 Oct 2017 – Sept 2018

- Running molecular diagnostics on mosquito samples, investigating insecticide resistance
- *In silico* work on the role of small RNAs in resistance in *Anopheles gambiae*

Publications

RNA-Seq-Pop: Exploiting the sequence in RNA-Seq - a Snakemake workflow reveals patterns of insecticide resistance in the malaria vector *Anopheles gambiae*

Sanjay C. Nagi, Ambrose Oruni, David Weetman, Martin J Donnelly

📅 June 2022

📄 bioRxiv

High concentrations of membrane fed ivermectin are required for substantial lethal and sublethal impacts on *Aedes aegypti*

Max Hadlett, Sanjay C. Nagi, Manas Sarkar, Mark JI Paine, David Weetman

📅 January 2021

📄 Parasites & Vectors

Capturing the transcription factor interactome in response to sub-lethal insecticide exposure

Victoria A Ingham, Sara Elg, Sanjay C. Nagi, Frank Dondelinger

📅 July 2021

📄 Current Research in Insect Science

Identification of a rapidly-spreading triple mutant for high-level metabolic insecticide resistance in *Anopheles gambiae* provides a real-time molecular diagnostic for anti-malarial intervention deployment.

Harun Njoroge, Arjen van't Hof, Ambrose Oruni, Dimitra Pipini, Sanjay C. Nagi *et al.*

📅 Feb 2021

📄 bioRxiv

Molecular drivers of insecticide resistance in the Sahelo-Sudanian populations of a major malaria vector

Sulaiman Ibrahim, Abdullahi Muhammad, Jack Hearn, Gareth D. Weedall, Sanjay C. Nagi *et al.*

📅 April 2022

📄 bioRxiv

Training

Dev Ops culture and mindset

UC Davis

📅 4 weeks, July 2022

Coursera online course into the Dev Ops culture, mindset and its importance

Snakemake

University of Cambridge

📅 2 days, Jan 2020

Snakemake workshop for reproducible data analysis, ran by Johannes Koester

RNA transcriptomics

Wellcome Genome Campus

📅 10 days, June 2019

Hands-on training in the latest laboratory and computational methods for transcriptomic analysis

Amplicon Sequencing

MalariaGEN, Sanger Institute

📅 7 days, Dec 2019

Hands-on lab workshop - "Genomic Surveillance of Malaria"

Referees

Prof. Martin J Donnelly

@ Liverpool School of Tropical Medicine

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PhD supervisor

Pembroke Place, L3 5QA

Liverpool, UK

Prof. Hilary Ranson

@ Liverpool School of Tropical Medicine

✉ Hilary.Ranson@lstm.ac.uk

Previous Employer

Pembroke Place, L3 5QA

Liverpool, UK

Dr. David Weetman

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MSc supervisor

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