Dr. Sanjay Curtis Nagi

Post-doctoral researcher

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About

I am a post-doc at the Liverpool School of Tropical Medicine, having recently completed my PhD studying genomic surveillance of *Anopheles gambiae*. My research sits at the interface of population genomics, molecular, and vector biology, and the rapid evolution and spread of insecticide resistance is of major interest. I enjoy developing software to empower other scientists to perform advanced and reproducible research. I am a highly motivated, enthusiastic and independent learner, and believe in a culture of continuous improvement and learning.

Selected Awards

MRC CASE studentship
£125,000

InfraVec
Investigating the role of small RNAs in insecticide resistance | £11000

RNA transcriptomics 2019
MRC funding to attend training | £1220

Evomics Pop Gen
MRC funding to attend training | £2000

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

Post-doctoral researcher

Liverpool School of Tropical Medicine

Jan 2023-Current

- Built the Malaria Vector Selection Atlas
- Writing / publishing papers
- Developing grant applications
- PhD Supervisor (Lilian Namuli, *An. funestus* genomics)

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

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*

Teaching

TROP970 - Bioinformatics

- Lectures annually & give workshops

PAMCA-MalariaGEN genomics workshops

- Developed training materials
- Delivered 3 series of 8 online workshops to over 100 participants from LMICs
- Delivered in-person workshops at the PAMCA conference in 2022 and 2023

Training

Snakemake
University of Cambridge
2 days, Jan 2020

RNA transcriptomics
Wellcome Genome Campus
10 days, June 2019

Amplicon Sequencing
MalariaGEN, Sanger Institute
7 days, Dec 2019

Referees

Prof. Martin J Donnelly
@ Liverpool School of Tropical Medicine
Martin.Donnelly@lstmed.ac.uk
Pembroke Place, L3 5QA
Liverpool, UK

Prof. Hilary Ranson
@ Liverpool School of Tropical Medicine
Hilary.Ranson@lstmed.ac.uk
Pembroke Place, L3 5QA
Liverpool, UK

Selected Publications

Parallel evolution in mosquito vectors – a duplicated esterase locus is associated with resistance to pirimiphos-methyl in *An. gambiae*
Sanjay C. Nagi, Eric R. Lucas, ..., Martin J Donnelly
June 2024 — Molecular Biology & Evolution

Genomic Profiling of Insecticide Resistance in Malaria Vectors: Insights into Molecular Mechanisms
Sanjay C. Nagi, Victoria Ingham
March 2024 — bioRxiv, in revisions at Communications Biology

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, ..., Martin J Donnelly
January 2023 — Molecular Ecology Resources

Genome-wide association studies reveal novel loci associated with pyrethroid and organophosphate resistance in Anopheles gambiae and Anopheles coluzzii
Eric R. Lucas, Sanjay C. Nagi, ..., Martin Donnelly, David Weetman
August 2023 — Nature Communications

AnoPrimer: Primer Design in malaria vectors informed by range-wide genomic variation
Sanjay C. Nagi, Faisal Ashraf, Alistair Miles, Martin J. Donnelly
May 2024 — Wellcome Open Research

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, ..., Sanjay C. Nagi *et al.*
August 2022 — Molecular Ecology