Sanjay Curtis Nagi

Post-doctoral researcher

UK, USA | sanjay.c.nagi@gmail.com | sanjaycnagi.com | @Sanjay_C_Nagi | sanjaycnagi | sanjaynagi

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 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

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, Alexander-egyir Yawson, ..., Alistair Miles, David Weetman, Martin J Donnelly

February 2024 bioRxiv

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

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

AgamPrimer: Primer Design in Anopheles gambiae informed by range-wide genomic variation

Sanjay C. Nagi, Alistair Miles, Martin J. Donnelly

December 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

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.*

August 2022 Molecular Ecology

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
Martin.Donnelly@lstmed.ac.uk
PhD supervisor
Pembroke Place, L3 5QA
Liverpool, UK

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

Dr. David Weetman
@ Liverpool School of Tropical Medicine
David.Weetman@lstmed.ac.uk
MSc supervisor
Pembroke Place, L3 5QA
Liverpool, UK