



**Lundi 21 novembre 2022, 11:00**

Salle de réunion + visio

## **UNDERSTANDING THE RESISTANCE LANDSCAPE TO GENE DRIVE**

par

Ioanna Morianou

Thèse, Imperial College London

(now Biocentis)

🔍 Gene drives are engineered selfish genetic elements with the potential to spread throughout insect populations for sustainable vector control. Recently, a CRISPR-based gene drive was shown to eliminate caged populations of the malaria mosquito by targeting the female-specific exon of the highly conserved doublesex gene.

🔍 Despite success in the laboratory, natural populations might still be able to evolve resistance to the gene drive. Resistant alleles may be naturally-occurring or generated by gene drive activity itself. To assess the potential for resistance to this gene drive we analysed existing population genomics data and performed a large-scale forward mutagenesis screen, through which we examined over 9,000 mutants. We identified several putatively resistant mutations and engineered these into the mosquito genome using a novel CRISPR-mediated cassette exchange method.

🔍 By testing these we made interesting discoveries regarding the nature of resistance. Overall, this pipeline was effective in evaluating the potential long-term sustainability of gene drive, and can be applied for this purpose prior to field testing.