



3rd global
Genetic
Biocontrol
Congress

3rd

Global Congress on Genetic Biocontrol Technologies

Congress theme

*“Advancing responsible genetic biocontrol innovationsto
improve animal and public health, strengthenvector control,
and protect ecosystems.”*

Dates

March 15–18, 2027

Venue

Radisson Blu Hotel, Nairobi,Kenya

Organized by
African Genetic Biocontrol Consortium



African Genetic
Biocontrol Consortium
Build | Inform | Expand



Willy Tonui, PhD, EBS,

 ***Founder and Chairman, African Genetic Biocontrol Consortium***

Genetic biocontrol is an approach for controlling or eliminating specific organisms that threaten public health, food security and biodiversity that uses genetic variants (natural, induced or transgenic) of the target species as the controlling agents to affect the target species in ways that reduce its undesirable impacts. Robust transgenic and genome editing technologies are fueling expanding research and development of genetic platforms and systems for combating pathogen and parasite-transmitting mosquitoes, plants and insects that reduce food security, and invasive species that are destroying biodiversity.

This unique Congress will focus exclusively on the topic of genetic biocontrol and will serve to encourage cooperation, collaboration, communication, and new and exciting science at a time when new technologies such as gene drive and Wolbachia-induced cytoplasmic incompatibility are being developed.

This Congress will bring together researchers investigating genetic systems with potential applications to genetic biocontrol with technology developers and those implementing genetic biocontrol strategies to share knowledge, foster new research, compare lessons-learned and develop best practices.

This Congress will feature discovery research along with technology development and ongoing operational experiences of those moving existing technologies to the field. The Congress will bring those working on insects, plants, fish, mammals, and other organisms together. This is an opportunity to bring researchers, developers, and practitioners together so that future genetic biocontrol activities will take place within a community with shared interests and values.

About The Congress

About The African Genetic Biocontrol Consortium

The Africa Genetic Biocontrol Consortium (the Consortium) was established as an agreement among member organizations committed to the mission and goals to contribute to expanding African self-determination of the course of research, development, and use of genetic biocontrol approaches for controlling and eliminating malaria and other vector-borne diseases in Africa.

The Consortium was officially launched on November 30, 2020 by not-for-profit member organizations based in Africa that included the Africa One Health Network (AfoHNet), Africa Biological Safety Association (AfBSA), The Multilateral Initiative on Malaria (MIM), Network of African Science Academies (NASAC), Pan-African Mosquito Control Association (PAMCA) and the GeneConvene Global Collaborative (GeneConvene). The member organizations of the Consortium are regionally represented non-governmental professional or similar organizations representing disciplines such as biomedical research, biotechnology, entomology, vector control, public health, animal sciences, biosafety, ecology, environmental sciences, social sciences, and public engagement who are interested in genetic biocontrol technologies.

The Consortium is guided by a vision that seeks to build an informed local leadership to support decision-making on the utility of genetic biocontrol technologies for public health and requirements for their development in Africa. This will be achieved through a mission that aims to expand African self-determination of the course of research, development, and use of genetic biocontrol approaches for public health. To fulfil this mission the Consortium will provide a platform for interaction among African experts and institutions to enhance opportunities for technical capacity strengthening, knowledge exchange and deliberation about the challenges and opportunities of genetic biocontrol technologies for public health, which will amplify African influence on their development and provide critical input for decision-making by product developers, policy makers, and other stakeholders.

The approach of the Consortium is to provide the member organizations to conduct activities individually and/or jointly under the Consortium brand. It is expected that the Consortium will use its collective leverage to attract funding for activities and to inform other stakeholders. To achieve the desired impact, the Consortium will adhere to a set of core values in planning and executing its mission. These include teamwork, collaboration, power of negotiation, complementarity and strengths, continual improvement, transparency, and accountability.

About The 3rd Global Congress

The Consortium is delighted to host the 3rd Global Congress on Genetic Biocontrol Technologies in Nairobi, Kenya in March 15 to 18, 2027. The aim of the Congress is to bring together experts from around the world to share learnings across diverse disciplines related to genetic biocontrol technologies in a 4-day event.

This Congress promises to be an engaging and stimulating event. Attendees interested in genetic biocontrol drawn from a broad spectrum of vector biologists, biosafety, and biosecurity, pharmaceutical, biotechnology research, development and clinical organizations are expected to attend. The conference draws national and international attendees from academic, commercial, research, non-governmental, and governmental sectors. It is a great opportunity to showcase your products to a broad audience of professionals.

**4 DAYS OF
PROGRAMME**

**8 PLENARY
SESSIONS**

**1 HOST CITY:
NAIROBI**

**6 FOUNDING
MEMBERS**

PARTNER WITH US

Exhibition Opportunities

The Congress offers you exposure to the many delegates of the conference and the opportunity to showcase your products and services to a global pool of customers. The exhibition area has been designed to provide the best possible promotional opportunities for participating companies. The exhibition will provide delegates and exhibitors with excellent opportunities to network and will be placed on the beautiful and spacious foyer of the hotel outside the conference rooms.



Who Should Exhibit?

Anyone who supplies, manufactures, provides services or products used in biomedical research, biosafety and biosecurity, the media fraternity and training institutions should exhibit.



When and Where

The 3rd Global Congress on Genetic Biocontrol Technologies, organized by the African Genetic Biocontrol Consortium will be held from March 15-18, 2027 at the Radisson Blu Hotel, Nairobi, Kenya.



Exhibition Schedule

The exhibition will be open from
8:00am – 6:00pm daily from March 15-18, 2027



Setp & Removal

Booth setup from March 15, 2027.
Displays removed on March 18, 2027.

Scientific Programme Committee & Congress Secretariat

The Scientific Programme Committee determines the theme of the annual conference, develops and releases the Call for Proposals, reviews all submissions, and defines the schedule for the 3rd Global Congress on Genetic Biocontrol.



17 COMMITTEE MEMBERS



5 SECRETARIAT STAFF



Scientific Programme Committee

Chair, Vice Chair and members



Prof Charles Mbogo

 *Chair, Scientific Program Committee*

Prof. Charles Mbogo is a retired Chief Research Scientist and public health entomologist at the Kenya Medical Research Institute. He has extensive experience conducting entomological research across Kenya, Ethiopia, and Eritrea, with a primary focus on malaria vectors. His work has included large-scale evaluation of insecticide-treated bed nets, studies on insecticide resistance, and the advancement of integrated vector management (IVM) strategies, demonstrating a holistic approach to controlling vector-borne diseases.

He led the development and implementation of vector surveillance systems at local and national levels. As a key member of the World Health Organization's technical working groups, he shaped global vector control strategies that integrate vectors, the environment, and public health.

Prof. Mbogo is the founder and President of the Pan African Mosquito Control Association, leading efforts to reduce mosquito-borne diseases across Africa. He plays a pivotal role in the Gene Drive Forum and the African Genetic Biocontrol Consortium, driving innovation in genetic vector control.

In addition, he serves as the founding Board Trustee of the Legrand Logik Foundation, which supports children and youth through education, ICT, mentorship, and shelter. His career reflects a strong commitment to scientific excellence, capacity building, and mentorship of emerging African scientists.



Etienne Bilgo

 *Vice Chair, Scientific Program Committee*

Dr. Etienne Bilgo is an Associate Research Professor at the Joint Parasitology and Medical Entomology Laboratory of the Institut de Recherche en Sciences de la Santé (IRSS) and Centre Muraz in Bobo-Dioulasso, Burkina Faso. His research focuses on developing innovative microbial biotechnologies for the control of mosquito-borne diseases, particularly malaria and dengue, with expertise spanning symbiont-based interventions, entomopathogenic fungi, and vector microbiome engineering. He has delivered presentations at more than 40 international conferences, received 23 international fellowships and awards, and was recognized as Burkina Faso's Best Early/Mid-Career Researcher (under 40 years) in 2020.

He also co-received the prestigious 2020 AAAS–Newcomb Cleveland Prize for a landmark publication in science and has supervised and mentored 27 students across undergraduate, master's, and doctoral levels. His current work extends beyond technology development to address the biosafety, risk assessment, regulatory, and community engagement aspects of emerging endosymbiont-based approaches, including Wolbachia, with the goal of supporting the safe and evidence-based implementation of innovative vector control strategies across Africa.



Dr Joseph Odongo

 **Member**

Dr Odongo Oduor Joseph is a Kenyan molecular microbiologist, biotechnology specialist, and expert in the AI–Biosecurity intersection with over 12 years of multidisciplinary experience spanning biosafety regulation, biotechnology, artificial intelligence, adaptive data intelligence, and scientific research. He previously served as a Principal Biosafety Officer at the National Biosafety Authority of Kenya and is currently deployed to Kenya Border Management as an expert in adaptive data intelligence under Coordinated Border Management Framework, where he supports advanced data analytics, strategic risk intelligence, and cross-border coordination. He holds a PhD in Molecular Microbiology and Biotechnology and has contributed to research and innovation in molecular diagnostics, synthetic biology safety, predictive bio surveillance, bioinformatics, and AI integration within life sciences.

Driven by a vision for African-led scientific transformation, he develops collaborative AI ecosystems, research platforms, and knowledge-driven initiatives that integrate science, technology, and policy to address complex challenges in health security, agriculture, environmental governance, and emerging biotechnologies.



Vibha Ahuja

 **Member**

Based in New Delhi, India, Dr. Vibha Ahuja, Ph.D. (Microbiology) is the immediate Chief General Manager of Biotech Consortium India Ltd. She is an expert on biosafety and regulatory aspects, particularly with reference to genetically modified organisms, having more than 25 years of experience in the field. She is very well versed in issues related to the Indian biosafety regulatory framework and has been involved in the formulation and dissemination of guidelines. She has led the preparation of biosafety documents and communication/outreach activities to stakeholders. Throughout her long and distinguished career, she has been actively involved in capacity building initiatives in India and throughout South Asia. Dr. Ahuja has been actively engaged in the policy issues related to gene editing in India through engagement in the development of policy briefs by National Academy of Agricultural Sciences and member of drafting committee constituted by the Department of Biotechnology. She also organized stakeholder consultations and programmes for creating awareness about regulations of gene editing.



Thato Mogapi

 **Member**

Ms Thato Mogapi has an academic background in microbiology, biotechnology, and public health, with extensive experience in the agriculture and environmental public sectors. Her work focuses on risk assessment and the management of genetically modified organisms, as well as alien and invasive species. She currently serves as the National Focal Point for the Cartagena Protocol on Biosafety and coordinates national implementation of the Convention on Biological Diversity–World Health Organisation joint programme on biodiversity and health. She also provides technical support to the national One Health Steering Committee, including as co-lead of the environment action track under the National One Health Framework.

Ms Mogapi is an Assistant Director for Biosafety and Alien Invasive Species at South Africa's Department of Forestry, Fisheries and the Environment. In this role, she supports implementation of the National Environmental Management: Biodiversity Act (Act 10 of 2004) provisions on genetically modified organisms. Her responsibilities include conducting environmental risk assessments, evaluating GMO applications, developing ERA guidance documents, coordinating biosafety research, and supporting national implementation of the Cartagena Protocol on Biosafety and related Convention on Biological Diversity programmes.



Martin Bundi

 **Member**

Dr. Martin Bundi is a Principal Research Scientist and Acting Director of Research Capacity Building at the Kenya Medical Research Institute (KEMRI). His work spans infectious diseases, biosafety and biosecurity, and health systems policy, with a focus on enteric pathogens, antimicrobial resistance, and global health security. He recently led the drafting of KEMRI's institutional charter, culminating in its designation as an Institution of National Strategic Importance in Kenya.

Dr. Bundi holds a PhD in Medical Science from Nagasaki University and has over 17 years of research and leadership experience. He has served as a consultant to Africa CDC and FAO on laboratory systems, biosafety, and food safety governance. He is a certified Biosafety Professional and Global Biosafety Mentor, biorisk management professional by IFBA, and a former President of the African Biological Safety Association.



Charles Quaye

 **Chair of the Biorisk Management Committee, Noguchi Memorial Institute for Medical Research, Ghana**

Dr. Charles Quaye is currently the Safety Manager of the Noguchi Memorial Institute for Medical Research and Chair of the Biorisk Management Committee of the Institute. He is also Research Fellow at the Department of Parasitology, Noguchi Memorial Institute for Medical Research, University of Ghana. Dr. Quaye holds PhD in Microbiology from Kwame Nkrumah University of Science and Technology, and an MPhil in Applied Parasitology from the University of Ghana, he has dedicated his career to advancing biomedical research and improving public health outcomes. He has been instrumental in securing research grants, such as the Royal Society of Tropical Medicine and Hygiene Small Grants and the Noguchi Seed Grant, to fund studies on skin neglected tropical diseases (SkinNTDs) and acute febrile illnesses (AFI) among children in Ghana.

In addition to his research, Dr. Quaye serves as the Quality Manager for the Department of Parasitology, ensuring high standards in Quality Management Systems (QMS). He is a lead auditor for Quality Systems (ISO 9001:2015), a SLIPTA programme auditor (ISO15189:2022), a certified Quality Management Professional and an IFBA Certified Biorisk Manager (ISO 35001:2019). He currently has the responsibility of managing Noguchi's Biosafety Biosecurity programme and the institute's Safety Office, coordinating safety protocols, and enhancing a safety culture within the biomedical research environment. Charles is very interested in regulatory frameworks and its implementation in a safe research environment and has supported several national training programmes on biorisk management. Beyond his professional endeavors, Dr. Quaye enjoys travelling, reading journals and novels, playing table tennis, and playing soccer.



Givemore Munhenga

 **Member**

Dr. Givemore Munhenga PhD (Medical Entomology) a South African NRF rated scientist working as a Principal Medical Scientist with National Institute for Communicable Diseases and a Senior Researcher at Wit Research Institute for Malaria. He holds a Doctor of Philosophy in Medical Entomology from the University of the Witwatersrand, a Masters in Tropical Entomology from University of Zimbabwe and a BSC Hons in Applied Biology and Biochemistry from National University of Science and Technology (Zimbabwe). Dr Givemore Munhenga has over ten years' experience in providing expertise and research in both public health and agriculture. His work portfolio includes giving entomological support to National Malaria Control Program, assisting designing framework for vector control operations and development of vector collection tools applicable under low malaria transmission.

Dr Munhenga research focuses on the biology and ecology of insects of medical importance particularly malaria vectors. Givemore is passionate about using such information to develop novel vector control approaches. Currently he is leading a research group investigating the potential of applying the Sterile Insect Technique technology as an additional vector control tool against the African malaria vector *Anopheles arabiensis*.

Dr Munhenga has over 10 years' experience in designing and leading community and regulatory engagement for safe and ethical roll out of novel vector control interventions including genetic control-based approaches such as the Sterile Insect Technique.

Dr Givemore Munhenga is a Member of the Pan African Malaria Control and American Mosquito Control Associations. He is involved in a number of academic citizenships that includes peer-reviewing, examination of postgraduate thesis, teaching and supervision of postgraduate students



Dr. Simon Kipngeno Langat, Ogw, Oap, Aciarb

 **Member**

For over the past 31 years, Dr Langat worked across science policy, research governance, and public sector leadership at national, regional, and international levels. His career has centred on strengthening the institutional and regulatory frameworks that underpin responsible scientific research, innovation, and international collaboration.

At the national level, he played a leading role in establishing Kenya's accreditation system for research ethics committees across universities and research institutions and served as Secretary to the National Bioethics Committee. He also served as a board member of the Kenya Medical Research Institute and oversaw the development and implementation of bilateral research collaboration agreements with South Africa, Japan, and France.

At the regional and international level, Dr Langat served as a member of UNESCO's Intergovernmental Bioethics Committee and as a steering committee member of the Africa Vaccine Regulatory Forum, contributing to the harmonisation of standards, cross-border review processes, and regulatory frameworks for science and innovation.



Moussa Savadogo

 **Member**

Moussa Savadogo is a regulatory affairs and environmental biosafety expert with more than 13 years of experience in genetically based vector control and agricultural biotechnology. He has worked extensively with AUDA-NEPAD, where he led biosafety initiatives, supported regulatory capacity-building across Africa, and contributed to regional platforms and international biodiversity negotiations. Since August 2024, he has worked as an independent consultant, providing technical assistance on biosafety, gene drive mosquitoes, and GMO application dossier development and review in countries including Burkina Faso and Mali. He holds a PhD in Applied Biological Sciences from the University of Ouagadougou and has also served as a visiting scholar at Michigan State University.



Agnes Yemisi Asagbra

 **Member**

Dynamic leader with extensive experience at the Federal Institute of Industrial Research Oshodi and National Biosafety Management Agency excelling in strategic planning and project management. Successfully implemented ISO 17025:2005 accreditation, enhancing laboratory standards. Adept at fostering collaboration and driving quality assurance initiatives, while promoting staff development and regulatory compliance to achieve organizational goals.



Misheck Mulumba

 **Member**

Dr Misheck Mulumba is an International Animal Health Consultant and previously the head of Animal Health and Protection at the Agricultural Research Council-Onderstepoort Veterinary Institute (ARC-OVI). He is a member of the World Organisation for Animal Health (OIE) Scientific Commission for Animal Diseases (SCAD) and the current Chairperson of the African One Health Network (AfoHNet). He holds a Bachelor of Veterinary Medicine Degree (BVM) from the University of Zambia, A Master of Science degree from Reading University and a Doctor of Philosophy (PhD) from the Prince Leopold Institute of Medicine in Belgium. His background training is in Epidemiology, Ticks Tick-borne diseases and Transboundary animal diseases (TADs). He has extensive field and laboratory experience in the following fields; vaccine production, TADs especially foot and mouth disease (FMD), peste des petit ruminants (PPR), contagious bovine pleuropneumonia (CBPP), trypanosomosis and tick-borne diseases (TBDs). He has published extensively on TBDs and TADs.

His interest branched off into One Health and he served as the Co-Chair of the South African One Health Forum and is the current Chairperson of the African One Health Network (AfoHNet). He is also an Editor on the PLoS journal. He is also the past Editor in Chief of the Onderstepoort Journal of Veterinary Research. His previous positions include being Director for the African Union/Centre for Ticks and Tick-borne Diseases (AU/CTTBD); and Project Coordinator and Network Surveillance Expert on the \$21.6m African Development Bank funded project for the then 15-member Southern African Development Community (SADC). He was also the Chief Veterinary Officer and Sub-program Manager, Animal Production and Health for the Ministry of Agriculture, Food and Fisheries in Zambia; Project Manager for ASVEZA, a Belgium-funded animal health project where he was responsible for the administrative, financial and scientific management of the project. He served in the veterinary field services as a Government Veterinary Officer in Zambia. Dr Mulumba is also a founding member of the African Chapter of the Wildlife Disease Association (WDA) the IUCN Veterinary Specialist Group and the Veterinary Association of Zambia (VAZ). Dr Mulumba is a member of the Academy of Science in South African (ASSAf) Standing Committee on Biosafety and Biosecurity.



Jacqueline Kado

 **Member**

Dr. Jacqueline Kado is the Executive Director of the Network of African Science Academies (NASAC), a consortium of 32 science academies spanning diverse scientific disciplines across the African continent. She holds a Doctorate in Human Development from Atlantic International University, USA, a Master of Arts in Project Planning and Management, and a Bachelor of Education in Commerce and Mathematics, both from the University of Nairobi, Kenya. With over 20 years of experience, Dr. Kado has been at the forefront of initiatives that bridge the gap between science and policy in Africa. A staunch advocate for homegrown solutions, she champions the role of science in driving sustainable, African-led development. Her leadership is marked by a commitment to fostering self-determination through the strategic integration of science and policy. Dr. Kado serves on several international boards and committees, contributing her expertise to regional and global initiatives. Her work embodies a vision for Africa's scientific community to be a cornerstone in addressing the continent's developmental challenges.



Gloria Ogbaki

 **Member**

Gloria Ogbaki, PhD, is a science communication strategist with over a decade of experience shaping public trust in biotechnology regulation across Africa. As Head of Information and Public Relations at Nigeria's National Biosafety Management Agency, she designs and leads the national communications strategy for the regulation of modern and emerging biotechnology and biosecurity, translating complex regulatory science into public-facing engagement across media, policy, and community stakeholders. She chairs the African Science Communicators Forum, advancing science communication as infrastructure for evidence-based governance across the continent. Gloria holds a PhD in Development Communication, specializing in Science Communication, Biotechnology, and Biosafety, with doctoral research examining Nigeria's national biosafety communications strategy, grounding her practice in the same regulatory systems she now helps govern.



Ama Kudom-Agyemang

 **Member**

Ama Kudom-Agyemang is a seasoned environmental, climate change and science communication specialist with over 20 years of experience in journalism, media training, and development communication across Africa. An award-winning journalist, she is known for simplifying complex climate, biotechnology, and natural resource issues for diverse audiences. She is a Columnist for Business & Financial Times; reports for Environewsigeria.com; and leads the Media Platform on Environment and Climate Change (MPEC). Ama coordinates MPEC's flagship activity – The Biennial Media Forum on Natural Resources, Environment, Climate Change and Science (BiM NECS). It is a high-level platform that convenes journalists, scientists, policymakers and civil society to foster informed, evidence-based media engagement on pressing environmental and climate issues in Ghana and across Africa.

As a media trainer, communication consultant and a commissioned writer/documenter, Ama has provided services to clients including the Japanese Government/UNDP, UNICEF Ghana, NEPAD, African Genetic Biocontrol Consortium; IUCN Ghana, Proforest, Care Ghana, Ghana's Forestry Commission, National Biosafety Authority and Lands Commission to promote media understanding and public discourse on environmental resilience, climate change-science nexus and sustainability. From July 2021 – December 2024, she served as the Regional Chairperson of the Ghana's Bono East Regional Lands Commission and was also a member of the National Lands Commission. Ama holds an MA in Development Communication and is a respected voice in promoting impactful media engagements for worthy causes.



Sandra Lombe

 **Member**

Sandra is an accomplished communications specialist and passionate science communicator with over two decades of experience in Media and Communications. She currently is currently in charge of Communication at the National Biosafety Authority in Zambia, where she has led nationwide awareness, education, and stakeholder engagement programs to strengthen public understanding of biotechnology and biosafety. A firm believer in collaboration between scientists, researchers, and the media, Sandra champions clear, concise, and impactful communication to bridge gaps between science and society. She holds a Master of Science, a Bachelor of Arts in Communication and Public Relations, and a Diploma in Journalism, underscoring her commitment to excellence in science communication and public engagement among others.



Royden Saah

 **Member**

Royden is a passionate advocate for collaboration across diverse fields, bridging vector control innovation, ecosystem resilience, human health, and community wellbeing. As a Senior Technical Expert for Population Health Science at GeneConvene, he builds and sustains cooperation among governmental, academic, non-governmental, and international organizations, strengthening the knowledge and capacity jurisdictions need to make informed, equitable decisions about genetically modified mosquitoes as a tool to reduce malaria-related illness and death.

Before coordinating the Gene Drive Research Forum for GeneConvene, Royden unified 3 governments, 3 universities, and 3 non-profits across the US, Australia, and New Zealand to develop genetic tools for preventing species extinction on islands. Through the Genetic Biocontrol of Invasive Rodents Consortium (GBIRd), he championed genuinely interdisciplinary collaboration, ensuring social scientists, ecologists, mathematical modelers, and regulatory experts stood as equal partners alongside geneticists in this transnational work.

Before turning to conservation, Royden held a series of high-stakes public health roles, including Chief Microbiologist for the NC Department of Agriculture. At the North Carolina Department of Health and Human Services, he served as Public Health Scientist for assay and process development in public health emergencies and as Senior Manager of the Bioterrorism and Emerging Pathogens Diagnostic Team leading several teams and facilities across his state of 9 million people. He served internationally with the Guyana Ministry of Health as a Public Health Expert, and during the major West African Ebola epidemic, worked in the community as biosafety/laboratory referent for Médecins Sans Frontières (MSF) in Liberia. In 2020, he volunteered with WHO's Global Outbreak Alert and Response Network (GOARN) to strengthen COVID-19 detection and understanding in Papua New Guinea.



Congress Secretariat

AGBC and EHS Consultancy Ltd



Rosalia Omungo

 **Chief Executive Officer, AGBC**

Rosalia Omungo is an accomplished science journalist who served as the inaugural Chief Executive Officer for Kenya Editors' Guild, the foremost professional association for editors in Kenya. She led the institution for six years, stepping down in October 2025. In that capacity, she helped to raise the profile of Kenya Editors' Guild to become Africa's foremost professional association for editors, delivering the promise of professionalism and excellence in journalism. She completed the Knight Science Journalism fellowship at the Massachusetts Institute of Technology in 2017 and previously worked as television managing editor until 2018, where she led the Health, Science and environment desk. Her work entailed leading special projects, mentoring reporters, fostering partnerships to promote excellent reporting and commissioning stories for the broadcast. While in the newsroom, she reported widely on climate change and biodiversity.

She is a Climate Change Media Partnership (CCMP) fellow and was the inaugural Earth Journalism Scholar at University of California Berkeley Graduate School of Journalism in 2014. Her work has earned her accolades among them Commonwealth award for Environmental Reporting in Africa in 2010. She holds a Master's degree in development communication from Daystar University, Kenya and a post-graduate diploma in broadcast journalism from University of Nairobi, School of Journalism.



Raphael Jilani Mwalimu

 **Senior Manager Science, Technology, Innovation and Quality Assurance**

Dr. Raphael Jilani Mwalimu serves as the Senior Manager Science, Technology, Innovation and Quality Assurance at EHS Consultancy Ltd. He holds a Ph.D. in Biotechnology from Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology in Chennai, India, and an M.Sc. in Microbiology and a BSc (Microbiology, Genetics, and Chemistry) from Osmania University, Ts, Hyderabad. His extensive education has equipped him with a deep understanding of microbial processes and biotechnological applications. His research interests are in biotherapeutics, antimicrobials, biopesticides, biogenic nanoparticles, the system biology approach, and fermentation technology. Dr. Mwalimu published five articles in peer-reviewed journals indexed in SCIE, Scopus, and Web of Science, co-authored 8 book chapters, and presented three papers at an international conference. He has actively been engaged in professional development through participation in various webinars, seminars, and workshops. By fostering collaborative research projects and sharing his expertise, Dr. Mwalimu aims to inspire the next generation of researchers to explore innovative solutions in the life sciences. He has also completed short courses on fermentation technology and systems biology approaches to drug discovery in cancer organized by the Institute of Innovations in Tiruvannamalai.



Raphael Jilani Mwalimu

 **Senior Officer Finance and Administration**

Benard Lesalon Letoluo serves as a Senior Officer Finance and Administration at EHS Consultancy Ltd. He is a highly accomplished Certified Public Accountant with over a decade of experience as a strategic team leader in financial management and operational oversight. Holding a Master of Business Administration (Finance) from JKUAT and a bachelor's degree in business management from Moi University, he specializes in Financial Reporting, Cost Accounting, Budgeting, and Risk Management. Known for his ability to deliver insightful financial reports and optimize resource allocation, Benard consistently ensures financial accuracy and compliance while driving sustainable organizational growth and success.



Andrew Kipkoech

Senior Manager - Digital and Data Management

Andrew Kipkoech serves as the Senior Manager - Digital and Data Management at EHS Consultancy Ltd. supports the African Genetic Biocontrol Consortium as an ICT Coordinator. He is the primary responsibility is to manage information technology and computer systems, control and evaluating IT and electronic data operations within the Consortium. He holds a BSc degree in Informatics and Computer Science from Strathmore University.



Kipkorir Evans

Finance Manager

Kipkorir Evans is a dedicated finance professional with a strong academic and practical background in accounting and financial management. He holds a Bachelor of Commerce (Finance) from Egerton University, a Diploma in Finance from Mount Kenya University, and is a Certified Public Accountant (CPA). He is currently in his final semester pursuing a master's degree at Kenyatta University.

With extensive experience working across various organizations, Kipkorir has developed expertise in financial reporting, budgeting, compliance, and operational efficiency. He currently serves as the Finance Manager Administration at Environmental Health Safety (EHS) Consultant Limited, where he plays a key role in strengthening financial systems and supporting organizational growth.

3rd GLOBAL CONGRESS FULL PROGRAM

High-Impact Congress Breakfast Sessions



Theme: To provide dynamic morning exchanges and high-impact breakfast sessions that inspire transformative ideas, advance breakthrough genetic biocontrol, and mobilize global action.



Participants: Speakers, moderators, early-career researchers, regulators, and invited stakeholder representatives to participate.

Practical One-Hour Format (7.30 am - 9.00 am)

Day	Breakfast Theme 7:30am - 9:00am	Core Programme
Day 1 Mon March 15	Welcome, orientation, and global networking breakfast	Introduce the 3rd Congress objectives, participation arrangements, and expected outcomes, followed by structured networking across countries, disciplines, and stakeholder groups. Session Co-Chairs Prof Charles Mbogo and Dr Etienne Bilgo
Day 2 Tue March 16	Technical expert roundtables	Run parallel, facilitated discussions on priority themes and science on genetic and non-genetic biocontrol science, biosafety and risk assessment, regulation and governance, ethics, public engagement, implementation, and capacity strengthening. Session Co-Chairs - Dr Moussa Savadogo and Dr Thato Mogapi
Day 3 Wed March 17	Stakeholder and regional consultation	Organize mixed tables representing researchers, regulators, policymakers, funders, industry, civil society, communities, and regional networks. Ask each table to identify major opportunities, concerns, evidence gaps, and collaboration needs. Session Co-Chairs Dr Jackie Kado and Dr Gloria Ogbaki.
Day 4 Thu March 18	Commitments and action-planning forum	Convert congress discussions into practical next steps. Participants should identify joint initiatives, policy or research priorities, responsible organisations, indicative timelines, and follow-up mechanisms. Session Co-Chairs Dr Misheck Mulumba and Dr Agnes Asagbra.



Daily Rythm

Each day opens with a High-Impact Breakfast Session (8:00–9:00 am) before transitioning into the main plenary programme, with health breaks and lunch built in throughout.

Welcome, orientation, and global networking breakfast

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MONDAY, MARCH 2027



High-Impact Congress Breakfast Sessions (7:30am - 9:00am): Opening Ceremony and Keynote address.
Plenary Session 1: Reimagining Africa's Health Future Through Genetic Biocontrol.

Moderators: Prof Charles Mbogo & Etienne Bilgo



Venue: Main Hall Kilimanjaro

7:00 - 9:00 am

Registration (Day 1)

9:00 - 10:00 am

Welcome Remarks:

Rosalia Omungo, Chief Executive Officer, African Genetic Biocontrol Consortium, **Willy Tonui PhD**, Founder and Chairman, African Genetic Biocontrol Consortium, **Michael Santos PhD**, Senior Vice President, Science Partnerships, Foundation for the National Institutes of Health, **Mark Whittaker**, Senior Research Manager, Infectious Disease, WellCome Trust, **Prof. Shaukat Abdulrazak**, Principal Secretary for Science, Research and Innovation, State Department for Science Research and Innovation, Office of the Prime Cabinet Secretary, Republic of Kenya.

Chief Guest: **H.E. Dr. Hon. Musalia Mudavadi, E.G.H.** (TBC), Prime Cabinet Secretary & Cabinet Secretary for Foreign and Diaspora Affairs

Congress Keynote address: TBC

Title: Shaping the Future of Genetic Biocontrol Technologies: Precision Science, Responsible Innovation, and Global Impact. The keynote explores how advanced genetic technologies can precisely manage harmful pests and disease vectors. It emphasizes that scientific advancement must be supported by robust safety evaluation, ethical oversight, transparent governance, and meaningful public engagement. It also outlines the potential worldwide benefits of genetic biocontrol for human health, agriculture, biodiversity, and sustainable development, and urges scientists, policymakers, communities, and partners to work together to turn its promise into safe, inclusive, trusted solutions that save lives, improve food security, conserve biodiversity, and support a sustainable future

10:00 - 10:30 am

Photo Session, Health Break

10:00 - 10:30 am

This session will convene senior government, regulatory and institutional leaders from selected African countries to advance coordinated policy action. The objective is to establish a shared understanding among senior officials of disease-control challenges, evidence on emerging vector-control tools and governance issues requiring leadership decision

Session Keynote: Vector borne diseases, trends, current interventions and emerging biocontrol options
 – Dr. Lauren Carrington, Vector, Disease Control, Elimination and Eradication unit Malaria and Neglected Tropical Diseases department, World Health Organization

The speaker will provide an overview of the evaluation of vector-release strategies for vector control, including genetically modified mosquitoes, *Wolbachia*-based population replacement, and sterile insect techniques. She will describe how WHO is examining the available evidence through systematic reviews, benefit–harm assessment, contextual analysis, and guideline development. The speaker will further emphasize that, notwithstanding their technical distinctions, these approaches encounter common challenges related to evidence generation, governance, community engagement, biosafety, monitoring, and implementation, thereby offering opportunities for cross-learning across disease-control disciplines.

11:00 - 11:30 am

Q&A

11.30 - 13.00 pm

Regional leadership roundtable: Regional and country policy and legal readiness (High level ministry and country leaders from African countries).

This session will convene senior government, regulatory, and institutional leaders from selected African countries to review policy progress. The roundtable discussions will stress-test their countries' policy and legal readiness; explore how innovative genetic biocontrol tools can be integrated into national plans, health security priorities, and African Union commitments; identify key policy, legal, and institutional gaps across participating countries; and agree on opportunities for regional cooperation

13:00 - 14:00 pm

Lunch Break



Plenary Session 2: Global Advances in Genetic Biocontrol Applications- Regulatory readiness

Moderators: Moussa Savadogo & Thato Mogapi



Venue: Main Hall Kilimanjaro

14:00 - 16:00 pm

This session aims to define clear, proportionate, science-based pathways for contained research, field trials, risk and ethics reviews, cross-border consultation, and post-release monitoring in participating countries.

Introductory presentation: Christiane Maia: Evaluation and regulation of *Aedes aegypti* mosquitoes infected with the *Wolbachia* bacterium: Anvisa's (Brazil)

Regulatory roundtable 2: Regulatory readiness (Head of agencies- Health, biosafety and environment). *During roundtable discussions, participants from health, biosafety and environmental agencies will identify key regulatory laws, guidelines, and gaps across participating countries and agree on opportunities for regional cooperation*

16:00 - 16:30 pm

Health Break

16:30 - 17:30 pm

Q&A, discussions and recommendations

END OF DAY ONE

Technical Expert Roundtables

TUESDAY, MARCH 2027

**High-Impact Congress Breakfast Sessions (7:30am - 9:00am):****Plenary Session 4:** Global Advances in Genetic Biocontrol Applications- Institutional Readiness and Research Capacity**Moderators:** Agnes Asagbra**Venue:** Main Hall Kilimanjaro**9:00 - 10:30 am**

This session will convene senior government, regulatory, and institutional leaders from selected African countries to assess research capacity and readiness. It will evaluate whether regulators, biosafety and ethics bodies, laboratories, entomological surveillance systems, modelling, and data analysis have the capacity to approve genetic biocontrol applications and products.

Introductory presentation: Vincenzo Di Donato: Strengthening end-to-end genome editing capacity for genetic biocontrol in Africa

Institutional roundtable 4: Institutional readiness (Heads of research from key research institutions) will define principles for transparent risk assessment, public participation, and community engagement, and agree on opportunities for regional cooperation.

10:30 - 11:00 am

Health Break

11:00 - 13:00 pm**Breakout Sessions (Regulatory, Research and Capacity, engagement and communication, financing):**

Senior government, regulatory, and institutional leaders from selected African countries will work in expert groups to assess policy, regulatory, research, and institutional readiness for genetic biocontrol. They will evaluate the capacity of regulators, biosafety and ethics bodies, laboratories, entomological surveillance systems, modelling, and data analysis to support approval of applications and products across Africa and recommend practical steps to close gaps and strengthen capacity.

13:00 - 14:00 pm

Lunch Break

14:00 - 15:30 pm

Plenary negotiation of the leadership communiqué and action matrix

15:30 - 16:00 pm

Health Break

16:00 - 17:00 pm

Plenary negotiation of the leadership communiqué and action matrix and next steps

Stakeholder and Regional Consultation

WEDNESDAY, MARCH 2027

**High-Impact Congress Breakfast Sessions (7:30am - 9:00am):****Plenary Session 6:** Advances toward Deployment of Genetic Biocontrol Technologies**Moderators:** Vibha Ahuja**Venue:** Main Hall Kilimanjaro**9:00 - 10:30 am**

The plenary session will provide an update on progress made towards the deployment of both genetic and non-genetic biocontrol vectors and their impacts.

Andrew Hammond: Beyond proof of concept: achieving deployable genetic control in Africa

Christie Linonge Etombi: From readiness to scale: defining pathways for Wolbachia-based dengue control in Africa

Perran Ross: Lessons for genetic biocontrol from Wolbachia release programs in mosquitoes in Australia

Fredros Okumu: Prospects of *An. gambiae*-based gene drives in east and southern Africa.

10:30 - 11:00 am

Health Break

11:00 - 13:00 pm

The plenary session will outline the stepwise decision-making process for genetic biocontrol tools for experimental release and their impacts.

Massouroudini Akoudjin: Risk Assessment of the Release of Genetically Modified Male-Biased Mosquitoes (*Ac(PMB)1*) in a Village in Western Burkina Faso

Nikolay Kandul: NextGenSIT: A Regulatory-Optimized Bridge Technology Toward Gene Drives

Bernard Bett: Evaluating the potential impact of genetic biocontrol of *Aedes* mosquitoes on dengue transmission in the Horn of Africa.



Break Out Session: Exploration, laboratory detection and characterization of endosymbionts in natural mosquito populations

Moderators: Vibha Ahuja**Venue:** Main Hall Kilimanjaro**11:00 - 13:00 pm**

This session explores mosquito-associated bacteria, fungi, and microsporidia and their potential use in innovative, sustainable malaria vector control.

Carine Létitia Traoré: *Wickerhamomyces* spp. in *Anopheles gambiae* s.l.: Prevalence, Tissue Distribution and Potential for Innovative Mosquito Biocontrol in Burkina Faso.

Aïcha Fatimata SODRE: Attractive sugar bait-mediated dissemination of symbiotic *Serratia* sp. in *Anopheles* for biological control of malaria Transmission.

Agapitus Kato: Exploring the Mosquito Microbiome for Biological Control: Putative Endosymbionts of *Anopheles gambiae* and *Anopheles arabiensis* in Uganda.

Phocas Mazimpaka: Prevalence of Microsporidia MB Symbiont in *Anopheles* Vectors in Rwanda.

13:00 - 14:00 pm

Lunch Break



Break Out Session: Exploration, laboratory detection and characterization of endosymbionts in natural mosquito populations

Moderator: Andrew Hammond



Venue: Main Hall Kilimanjaro

14:00 - 17:00 pm

Wolfgang Richard Mukabana: Using gene drive mosquitoes to eliminate malaria on the western equatorial coast of Central Africa

Jackson Champer: Progress in *Anopheles stephensi* gene drives and modeling

Nditange Shigwedha: A Risk-Pathway Framework for Biosafety Preparedness for Gene-Drive Mosquito Technologies in Namibia

Jeremy BOUYER: Environmental Monitoring of Genetic Control in the African Region: the example of *Aedes albopictus* in Reunion Island.

13:00 - 18:00 pm

Workshop: Artificial Intelligence and Capacity Strengthening for Genetic Biocontrol Decision-Making

13:00 - 14:00 pm

CONGRESS DINNER AND SCICOM AWARD CEREMONY

END OF DAY THREE

DAY FOUR

18

Commitments and Action-planning forum

THURSDAY, MARCH 2027



High-Impact Congress Breakfast Sessions (7:30am - 9:00am):

Plenary 8: AI, Genetic Biocontrol and Science Communication in Africa

Moderators: Jackie Kado



Venue: Main Hall Kilimanjaro

9:00 - 10:30 am

Amelie Wamba: Communicating Genetic Biocontrol Technologies in Africa: Building Public Understanding, Trust, and Informed Engagement

Fidelia Oluomachi Ivoke: From Vector Genomes to Genetic Biocontrol Decisions: Harnessing Artificial Intelligence for Next-Generation Surveillance in Africa

Milliam Murigi: AI and the Future of Science Communication Is artificial intelligence transforming science communication or disrupting it?

Odongo Oduor Joseph: Machine Learning Enabled Detection and Quantification of Psychographic Narratives Associated with GMO Myths

Gloria Ogbaki: Trust Before Technology: Risk Communication Lessons from Nigeria's Biosafety Experience for Gene Drive Governance.

● **10:30 - 11:00 pm**

Health Break

● **11:00 - 13:00 pm**

PLENARY SESSION

● **13:00 - 14:00 pm**

Lunch Break

WORKSHOPS

Artificial Intelligence and Capacity Strengthening for Genetic Biocontrol Decision-Making

 15-18 March, 2027 3rd Global Congress

 4 Hours: 14:00 - 18:00 Hrs

 **Course organizer:** Justin Overcash, FNIH

Purpose.

African biosafety regulators, risk assessors, developers, and programme managers are already encountering artificial intelligence tools, often without institutional guidance on verification, confidentiality, data sovereignty, or accountability. This practical workshop will build foundational understanding, introduce the GeneConvene Academy, and help participants develop a shared approach to the responsible use of AI in genetic biocontrol decision-making.

Audience

Staff of national and regional biosafety authorities, risk assessors, Institutional Biosafety Committee members, developers, and programme managers involved in genetic biocontrol governance or decision-making.

Learning outcomes

At the end of the workshop, participants will be able to:



Explain how generative AI produces outputs, how to better use frontier models for scientific work, and why those outputs require verification.



Develop and apply a practical verification step to AI-assisted biosafety tasks.



Identify information that should not be entered into public AI systems.



Compare potential AI uses in dossier triage, literature search and problem formulation, and community communication.



Sign up for and utilize the GeneConvene Academy.

Workshop agenda

This four-hour agenda combines concise expert input, practical application, peer exchange, and action planning. The workshop will run from 14.00 to 18.00 hrs.

Four-Hour Workshop Agenda

14.00 – 14.15 15 min		Welcome, objectives, and baseline Introductions, objectives, expectations, and baseline poll.
14.15 – 15.15 60 min		AI basics and responsible use Core concepts and confident errors; guided exercise with a simulated or redacted regulatory artifact; error-hunt and debrief.
15.15 – 15.30 15 min		Spotting AI errors Output: Hands on practice spotting common AI errors
15.30 – 15.45 15 min		Break: Refreshments and informal exchange.
15.45 – 16.30 45 min		AI in biosafety workflows Four short examples: dossier triage, literature search and problem formulation, and community communication; moderated discussion. Output: Applications, opportunities and risks, and minimum controls.
16.30 – 17.00 30 min		GeneConvene Academy Academy introduction, Biosafety Technical Series 7 demonstration, and course review. Output: Know how to use the GeneConvene Academy.
17.00 – 17.40 40 min		Future thinking Presentation on the Future of AI and Risk assessment, Groups map how AI could be used to enhance decision making and classify AI support as plausible, premature, or human-led. Output: Insight into future use cases for AI in Biotech Risk Assessment and reflection on current feasibility.
17.40 – 18.00 20 min		Share-back and close Group highlights, post-poll, commitments, and next steps. Output: Evaluation and cohort interest.

Delivery approach

The workshop will combine short presentations, a guided demonstration, facilitated discussion, small-group work, and individual reflection. Participants will be seated at round tables where support group work, with approximately five to eight people per group.



Facilitation team:

Dr Overcash will serve as lead speaker. Additional workflow speakers and table facilitators will be confirmed based on expertise in biosafety regulation, risk assessment, community engagement, and responsible AI use. The lead facilitator will manage time, transitions, debriefs, and the integration of outputs.



Preparation and materials

- ✓ A simulated or fully redacted regulatory artifact for the practical exercise.
- ✓ A deliberately flawed AI-generated response for the error-hunt.
- ✓ Regulatory decision-mapping templates and markers.
- ✓ GeneConvene Academy access instructions.
- ✓ A projector, stable internet access, and an offline backup of all demonstrations.
- ✓ Pre- and post-workshop poll questions and participant commitment cards.



Workshop outputs

- 🚩 A one-page AI error identification sheet.
- 📄 An individual GeneConvene Academy learning pathway.
- 🎓 A simplified regulatory decision map from each group, identifying one plausible AI use, one premature use, and one decision that should remain under human judgment.
- 📝 A record of participant commitments and institutional questions.
- 👥 An invitation to join a follow-on learning cohort.



Evaluation and follow-up:

A brief pre- and post-workshop poll will measure changes in participants' confidence in explaining AI limitations, verifying outputs, and protecting sensitive information. The facilitation team will also review the quality of group outputs and collect participants' intended practices and follow-up questions.

Within two weeks, the organizers will circulate the workshop materials, consolidated guardrails, anonymized themes from the regulatory maps, links to selected Academy pathways, and details of the follow-on learning cohort.

Abstracts

3rd Global Congress on Genetic Biocontrol - 44 presentations

01

High-Level Leaders Forum: Reimagining Africa's Health Future With Genetic Biocontrol

 Governance & safety

Willy Tonui, African Genetic Biocontrol Consortium

Vector-borne diseases remain a major public-health burden in Africa, compounded by insecticide resistance, changing vector behaviour, climate-related transmission risks, limited financing and cross-border ecological threats. In response, this one-day high-level forum will convene senior government, regulatory, scientific and institutional leaders from nine African countries, together with regional and technical partners, to advance coordinated, country-led action against malaria and other vector-borne diseases. Participants will consider how innovative genetic biocontrol approaches, including genetically modified mosquitoes, gene-drive research, gene editing and related biological strategies can responsibly complement existing interventions through sound research, regulation, financing and communication. The forum will promote transparent governance, rigorous science and meaningful public engagement to strengthen policy coherence, regulatory preparedness and evidence-based decision-making across Africa. Strategic discussions will address policy alignment, science-based regulation, regional cooperation, research and institutional capacity, public trust, ethical oversight, sustainable financing and long-term monitoring. Expected outputs include an endorsed leadership communiqué, a nine-country action matrix with focal points and measurable milestones, a regional coordination mechanism, targeted capacity-building packages, and a financing and partnership roadmap. By aligning scientific innovation with political leadership, the forum will strengthen national readiness, advance responsible regional cooperation and support the public-interest governance of innovative vector-control tools.

02

Vector borne diseases, trends, current interventions and emerging biocontrol options

 Vector Control

Dr. Lauren Carrington,

Vector, Disease Control, Elimination and Eradication unit Malaria and Neglected Tropical Diseases department, World Health Organization

Vector-release strategies represent an increasingly important frontier in vector control, spanning both population-replacement and population-suppression approaches. These innovations include genetically modified mosquitoes and non-genetic methods based on symbiont-induced reproductive manipulation or irradiation-induced sterility. Although the technologies differ in their mechanisms, intended effects and regulatory classification, they share the deliberate release of modified or altered vectors and raise comparable questions for public health decision-making.

Available evidence supporting these differing approaches is at different stages of maturity. Wolbachia population replacement has been evaluated through large-scale field studies and is increasingly implemented against Aedes-borne diseases, leading to generation of epidemiological and operational evidence. Genetically modified mosquito technologies encompass diverse suppression and replacement approaches targeting malaria and Aedes-borne diseases, but epidemiological evidence remains limited.

This presentation will describe WHO's process for the evaluation and appraisal of the current evidence base, potentially informing recommendations for the respective interventions. It will outline the common evidence-to-recommendation pathway applied across vector-control interventions: systematic evidence synthesis; assessment of benefits, harms and contextual considerations; evidence-to-decision deliberation; and recommendation development through WHO's integrated Vector Control Guideline Development Group. Related operational guidance will also be elaborated.

Despite their differences, these fields face shared challenges in evidence generation, implementation and governance, creating considerable scope for reciprocal learning. Experience from Wolbachia evaluation and deployment may inform genetically modified approaches, while methods and perspectives from malaria-focused research may offer lessons for arbovirus control. Cross-dialogue could also strengthen approaches to environmental and ecological assessment, biosafety, spread and persistence, community engagement, monitoring and longer-term oversight. While differentiated assessment remains necessary, their evidence, governance and implementation frameworks need not develop in isolation.

03

Beyond proof of concept: Achieving deployable genetic control in Africa

 Vector Control

Andrew Hammond^{1,2,3*}

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Genetic control is a species-specific approach to suppress or modify harmful insect populations through the release of engineered insects. Approaches can be self-limiting, designed to disappear over time, or self-sustaining, using gene drives that can spread from a small release and act area-wide. Proof of concept is well advanced in malaria and arbovirus vectors, with first field releases in preparation. Whether these technologies are adopted will depend on socio-political ownership as much as on the science. This discussion will address some of the technical and operational obstacles facing a first field release and subsequent implementation at scale: durability against resistance, long-term forecasting, containment and reversibility, and production and delivery at national scale.

Our research at Biocentis addresses some of the regulatory and operational challenges that could slow the implementation of genetic control in Africa. Suppression systems are self-extinguishing by construction, so maintaining the strains takes skilled, high-technology work at every generation, and mass-producing them for safe release is harder still. To this end we have developed READY (Rearing-Enabled, Activated on DeploYment), which could hold diverse suppression systems, including gene drive, as stable homozygous strains – to simplify production at scale, ensure male-only release, and prevent breakdown or resistance during rearing.

Finally, we are closing the gap that has kept self-limiting control out of elimination campaigns: existing technologies can reach elimination, but only at costs that are unaffordable where the disease burden is greatest. Our 2GEN technology amplifies suppression while remaining contained, so a release can drive a population to elimination in the urban settings that dominate arbovirus transmission. Gene drive alone is not predicted to eradicate malaria, so elimination will need several technologies together, and a contained system released sooner can both prepare the path for an area-wide release and supplement it thereafter.

04

Characterization of the cultivable bacterial microbiota associated with *Anopheles coluzzii* mosquitoes infected with Microsporidia MB

 Researcher

Carine Létitia Traoré^{1,3}, Issiaka Saré^{1,2}, Etienne Bilgo^{1,2}

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³Université Nazi Boni (UNB), Bobo-Dioulasso, Burkina Faso.

Background: Microsporidia MB is a symbiont naturally present in mosquitoes of the *Anopheles gambiae* complex. This microorganism is capable of blocking plasmodium transmission, making it a promising candidate for the development of new malaria control strategies. Despite this growing interest, the interactions between Microsporidia MB and its host's bacterial microbiota remain poorly understood. The objective of this study was to characterize the cultivable bacterial microbiota associated with Microsporidia MB-infected (MB+) *Anopheles coluzzii* and to compare MB-uninfected (MB-) *Anopheles coluzzii*.

Methods: Culturable bacteria were isolated on Luria-Bertani (LB) medium from 16 biological pools, comprising eight MB+ pools and eight MB- pools, with each pool consisting of four mosquitoes. Genomic DNA was extracted from purified bacterial isolates using the 2% CTAB extraction method. A partial region of the 16S rRNA gene was amplified using universal bacterial primers, and the resulting PCR products were sequenced using the Sanger method to determine their taxonomic identity. Pool-level bacterial richness, Shannon diversity, and community composition based on Jaccard dissimilarity were compared between MB+ and MB- groups.

Results: A total of 60 bacterial colonies were selected for sequencing, of which 43 yielded sequences that passed quality control and could be reliably assigned to a bacterial taxon. Sequence analysis identified ten bacterial taxa. *Elizabethkingia anophelis* was the most frequently recovered taxon, representing 19 of the 43 identified isolates (44.2%), followed by *Cedecea* sp. (18.6%), *Cedecea neteri* (14.0%), and *Ralstonia pickettii* (7.0%). *E. anophelis* was recovered from both MB+ and MB- pools. MB+ pools yielded nine bacterial taxa compared

with five in MB- pools, and showed descriptively higher mean richness (2.38 vs. 1.25 taxa per pool) and Shannon diversity (0.636 vs. 0.390), although neither difference was statistically significant ($P = 0.360$ and $P = 0.537$, respectively). Jaccard-based community analysis also showed no significant difference in cultivable bacterial community composition according to MB infection status (PERMANOVA, $P = 0.378$).

Conclusion: These results provide a culture-based view of the bacterial microbiota associated with Microsporidia MB infection and highlight the need for larger, culture-independent and functional studies to investigate MB-microbiota interactions.

05

A CRISPR-Cas9 system targeting female reproduction in *An. funestus* for genetic control

 Research

Achaz-Achim Agolinou^{1,2}, Nicole Page², Zachary Stavrou-Down², Oliver Gilles Yemien^{1,2}, Holly Humphrey², Alessandra Lanfrancotti², Ashley Hall², Nabasnogo Odette Zongo^{1,2}, Honorine Kaboré^{1,2}, Gregoire Sawadogo^{1,2}, Nouhoun Traoré¹, Kientega Mahamadi¹, Hamidou Maïga¹, Tony Nolan², Abdoulaye Diabaté¹

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²Liverpool School of Tropical Medicine (LSTM), United Kingdoms “Liverpool”

Background: Gene drive strategies that target genes essential for female fertility represent a promising approach for the control of malaria vector populations. In particular, disrupting loci involved in oogenesis, such as *Nudel*, may enable effective population suppression while limiting fitness impacts on males, thereby improving the specificity and sustainability of genetic interventions. In this context, the present study aims to develop a gene knockout of the *Nudel* ortholog in *Anopheles funestus*, assess its effects on key life-history traits, and establish a multiplex gene drive line targeting this locus.

Methods: Orthology and synteny analyses were used to identify the *Nudel* ortholog in *Anopheles funestus*, followed by gRNA design targeting a conserved locus. A *Nudel* KO line was generated using CRISPR-Cas9 system. Phenotypic assays quantified egg production, larval output, and hatching rate across genotypes. Segregation analysis assessed KO inheritance patterns, and longevity assays compared survival among homozygous, heterozygous, and wild-type adults. A multiplex gene-drive construct was subsequently integrated at the *Nudel* locus to generate the gene drive line.

Results: The *Nudel* ortholog corresponds to AFUN009733 in the FUMOS reference, updated to AFUN2_001325 in the GABON-1 genome. Loss-of-function alleles severely impaired egg production, larval output, and hatching rate in homozygous KO females, whereas heterozygous females and males overall showed no significant differences relative to wild-type. Genotype proportions of the KO line followed Mendelian expectations, and adult longevity did not differ among genotypes. A gene-drive line targeting *Nudel* was successfully established with a transmission rate of 65% for the paternal line and 83% for the maternal line.

Conclusion: These findings identify *Nudel* as a haplosufficient female fertility gene in *An. funestus* and provide validated knockout and gene drive resources for further development of *Nudel* based population suppression strategies.

06

Pan-African Genomic Conservation of *Plasmodium falciparum* Transmission-Stage Antigens to Inform Engineered Vector Biocontrol Strategies

Reaserch

Daniel Sano¹, Aaron Sadindi¹, Cecily Nkomo¹, Davison Anotida Muzondo¹, Salody Sandra Shumba¹, Lyn Zhumo¹, Prosper Ndelela¹, Blessed Kudakwashe Madana¹, Branham Kwaramba¹, Convenience Chikwemya¹, Gerald Mboowa², Fanuel Songwe^{1*}

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Genetic biocontrol strategies for malaria require parasite targets that are conserved across geographically diverse populations. In this study, we evaluated five *Plasmodium falciparum* transmission-stage antigens CSP, Pfs25, Pfs48/45, Pfs230 and TRAP to prioritise candidates for future engineered vector-based transmission-blocking strategies. MalariaGEN Pf8 was the primary dataset. After sample quality control, retention of one representative sample per Pf8 case identifier, and balancing to a maximum of 30 samples per country, we analysed 596 samples from 21 countries and four African population groups. A recent-period sensitivity cohort comprised 394 samples from 14 countries (2015–2022). PASS biallelic coding SNPs with high genotype callability were extracted from identical 3D7 coding-sequence coordinates. Nucleotide diversity (π), amino-acid conservation, Shannon entropy, Tajima's D and geographic differentiation (FST) were quantified and integrated into a Biocontrol Target Suitability Index (BTSI). Independently, 63 SRA run-labelled datasets from Equatorial Guinea, Zambia, Malawi and Eritrea were processed against the same PlasmoDB-54 3D7 reference, jointly genotyped, depth-masked (DP $\geq$ 3), quality-filtered (QUAL $\geq$ 30) and assessed for whole-CDS callability.

Pfs25 showed the strongest Pf8 conservation profile ($\pi=4.1\times 10^{-5}$; 98.2% overall amino-acid conservation; 100% conservation for common amino-acid variants; mean FST=0.018; BTSI=0.997). Pfs230 ranked second (BTSI=0.670), followed by CSP (0.543), TRAP (0.505) and Pfs48/45 (0.501). Independent SRA validation supported Pfs25 conservation: only two globally callable variants were detected, filtered π was 8.45×10^{-5} and maximum pooled alternate-allele frequency was 1.8%. Whole-CDS callability for Pfs25 was 88.2% in Equatorial Guinea, 100% in Zambia and 92.7% in Malawi. Pfs230 remained comparatively conserved in well-covered Zambia and Malawi cohorts, whereas CSP and TRAP were more diverse.

Pfs25 emerged as the strongest candidate for future transmission-blocking genetic biocontrol investigation, with Pfs230 as a secondary target. Population-genomic validation can therefore strengthen target selection before advancing geographically scalable engineered vector-control strategies.

Keywords: *Plasmodium falciparum*; genetic biocontrol; Pfs25; Pfs230; population genomics; transmission blocking

07

Gene drives that target malaria parasites rather than malaria vectors to control disease

Reaserch

Author: Dean Goodman

Malaria is on the rise. Existing tools are failing to control disease, and annual deaths exceed 0.6 million. Gene drives offer the capacity to repress or eradicate problem pathogens like the malaria parasite¹. Thus far, gene drives to control malaria have all focused on the vector rather than the parasite itself. But do gene drives work in malaria parasites, and are they safe? We are building and testing a variety of gene drives in *Plasmodium* species that infect humans, monkeys, and rodents. Our gene drives aim to reverse drug resistance, ameliorate malaria-in-pregnancy, prevent spillover of *P. knowlesi* from monkeys into humans, restore the efficacy of rapid diagnostic tests (RDTs), and collapse transmission of deadly *falciparum* malaria. Deploying gene drive parasites entails considerable safety, ethical, social, and compliance considerations. We have been funded for world-first, in-human safety and efficacy trials of a homing, sex biasing *P. falciparum* gene drive. Exploration of ethics, economics, social licence, and regulatory frameworks for a field trial of our gene drive in a malaria endemic region are also built into our project. Our team thus has the first chance to assess the utility and acceptability of a new tool to control malaria. Importantly, this tool proposes release of a GMO pathogen, so the path to deployment is not simple.

We will present our progress-to-date in building and testing malaria parasite gene drives. I will also weigh the pros and cons of these powerful and innovative tools to modify pathogen populations.

¹ Wilde, M-L et al. (2025) Novel techniques for disrupting malaria transmission. *Trends in Parasitology* 41: 657-9

08

Drugging mosquitoes rather than people with antimalarials Reaserch

Author: Geoff McFadden

Malaria parasites have become resistant to almost all antimalarials. Resistance is virtually inevitable because we drug select a huge number of parasites—about one quintillion. We are trialling an alternative approach whereby we drug the mosquitoes not the people. Malaria parasites go through a population bottle neck in mosquitoes, with an infected mosquito having about 1 trillion-fold less parasites than an infected person. Mosquitoes drink nectar and sugars daily; only females blood feed and then only when they need to lay eggs. We fed *Anopheles stephensi* mosquitoes a new antimalarial known as T111 in their sugar water. A single feed of T111, ~5 picomoles, completely blocked the production of malaria parasite sporozoites in our mosquitoes. The drug feed could occur either prior to infection or during infection of the mosquitoes and was still effective. The T111 sugar solution remained active against mosquito parasites at 27°C for 1 month. We were also able to freeze-dry the mix of T111 and sucrose onto small squares of fabric and reconstitute the mix with water up to 1 year later, when it still abrogated malaria infection of mosquitoes. We envision drugging mosquitoes with antimalarial sugar baits as a cheap, simple solution to deploy in dwellings to reduce transmission. Drugging mosquitoes has the distinct advantage that it prevents disease rather than treats disease. Drugging mosquitoes can also ‘repurpose’ potent antimalarials that failed, for some reason, to succeed as viable drugs.

09

Wickerhamomyces* spp. in *Anopheles gambiae
s.l.: Prevalence, Tissue Distribution and Potential
for Innovative Mosquito Biocontrol in Burkina Faso
 Vector Control

Aïcha Fatimata SODRE^{1,2,3,4}, Edounou Jacques GNAMBANI^{1,2}, Domonbabele François de Salle HIEN¹, Issiaka SARE^{1,2}, Sèni ILBOUDO^{2,3}, Haoua TRAORE^{1,2,3}, Abel Sourou MILLOGO^{1,2}, Maurice KONKOB^{1,2}, Abdoulaye DIABATE^{1,2,3}, Fernand SANKARA⁴, Etienne BILGO^{1,2,3}

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Background: One of the strategies for vector control is biological control, which can use symbiotic microorganisms, including fungi. The genus *Wickerhamomyces*, a budding yeast belonging to the phylum *Ascomycota* and the family *Wickerhamomycetaceae*, whose natural habitats include plants, soil, fermented fruits, and flowers is found in the midgut and reproductive organs of mosquitoes. Previous studies have demonstrated a protective effect of a strain of this yeast against certain entomopathogenic microorganisms in *Anopheles stephensi*, highlighting its potential for vector control. The objective of this study is to isolate and identify the genus *Wickerhamomyces* in field-caught mosquitoes *Anopheles gambiae* complex in western in Burkina Faso.

Methods: Mosquitoes collected from three areas of Bobo-Dioulasso in western Burkina Faso (Dioulassoba, Vallée du Kou, and Soumousso) in November 2024 were first identified morphologically. Their different organs were then dissected, homogenized in PBS, and cultured on Sabouraud Chloramphenicol agar. Molecular biology techniques enabled the identification of the yeast *Wickerhamomyces* directly from organ pools and from colonies. R software analyses used Pearson's chi-squared test or Fischer's exact to assess *Wickerhamomyces*, the significance threshold was set at $P < 0.05$

Results: The overall prevalence of *Wickerhamomyces* in *Anopheles gambiae* s.l. mosquitoes was 17.1%. This prevalence varied significantly according to the collection site (p-value = 6.62

$\times 10^{-8}$), the *Anopheles gambiae* species (p-value = 7.594×10^{-9}), the developmental stage of the mosquitoes (p-value < 0.001), the sex of mosquitoes (p-value = 0.027) and the physiological status of female mosquitoes (p-value < 0.001). However, it was similar across all organs. Four mosquitoes (two *Anopheles arabiensis* and two *Anopheles coluzzii*) were co-infection of *Wickerhamomyces* and *Plasmodium falciparum*.

Conclusion: This study reports the prevalence of the genus *Wickerhamomyces* in field-caught mosquitoes of the *Anopheles gambiae* complex, highlighting the need to investigate its potential for malaria control in Burkina Faso.

Keywords: *Anopheles gambiae* s.l, Malaria, *Wickerhamomyces*, *Plasmodium* infection B, Burkina Faso

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Attractive sugar bait-mediated dissemination of symbiotic *Serratia* sp. in *Anopheles* for biological control of malaria Transmission

Communication

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Symbiotic bacteria associated with *Anopheles* mosquitoes, such as *Serratia*, can inhibit *Plasmodium* development and thus represent promising biological control agents for reducing malaria transmission. However, disseminating *Serratia* effectively throughout wild mosquito populations remains a major challenge for field implementation of this strategy. Here, we investigated the feeding preferences of *Anopheles coluzzii* for natural fruit juices, their capacity to promote *Serratia* gut colonization, and their effects on mosquito fitness. Adult *An. coluzzii* were offered banana, watermelon, papaya, and glucose juice in a large cage, and feeding preferences were determined by recapturing mosquitoes and examining gut contents. *Serratia* gut colonization was then quantified for each sugar source. The two most attractive juices were combined into a cocktail, and mosquito preference for this cocktail, glucose, and honey was assessed, along with effects on survival, fecundity, and fertility. Banana juice was the most attractive source (35.9%), followed by watermelon juice (15.7%), yet watermelon-fed mosquitoes showed the highest *Serratia* colonization (1.8×10^7 CFU/midgut). Among artificial

sugar sources, honey was preferred over glucose. Mosquitoes fed the fruit cocktail showed markedly reduced survival, with a median survival time (LT50) of 3 days. Notably, *Serratia* presence did not alter feeding preferences for any tested sugar source. These findings identify natural fruit juices as promising means for disseminating *Serratia* in wild mosquito populations. Future work should characterize the microbial communities naturally present in these juices to clarify their interactions with *Serratia*, *Plasmodium*, and the mosquito host, supporting the development of symbiont-based malaria control strategies.

Keywords: Enterobacteriaceae, attractive sugar, microbiota

CRISPR-Cas9-mediated disruption of *Dicer-1* in *Anopheles gambiae*: Preliminary progress towards understanding the role of the miRNA pathway

 Communication

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Background: MicroRNAs (miRNAs) are important post-transcriptional regulators of gene expression and contribute to diverse biological processes in mosquitoes, including development, reproduction, and immunity. *Dicer-1* is a key enzyme in the miRNA biogenesis pathway, and its functional contribution to these processes in *Anopheles gambiae* remains poorly understood. Characterizing the consequences of *Dicer-1* disruption may provide insights into mosquito biology and identify mechanisms that could be relevant to future genetic control strategies. The objective of this study was to initiate the generation, and validation of a *Dicer-1* disrupted mosquito line for downstream functional analyses.

Methods: CRISPR-Cas9-mediated genome editing was used to target the *Dicer-1* locus in *An. gambiae*. Guide RNA (gRNA) was designed to target a selected region of *Dicer-1* in silico. A CRISPR helper plasmid incorporating the gRNA expression cassette, Cas9, and a selection marker, together with a donor plasmid containing left and right homology arms flanking the targeted region and a marker gene, were designed and constructed. Following validation of plasmid constructs, CRISPR-Cas9 editing reagents were introduced into *An. gambiae* embryos through microinjection. Surviving individuals were screened for fluorescence to identify individuals expressing the introduced marker.

Results: A total of 1,980 *An. gambiae* embryos were microinjected, yielding a 13.64% hatch rate (n=270), of which 6.67% (n=18) were transiently fluorescent individuals. Of these, 11 survived to adulthood (3 males, 8 females). Transiently fluorescent adults were outcrossed to wild-type *An. gambiae*, and the resulting progeny were screened to assess potential germline transmission. To date, a total of 2,481 progeny derived from these transient crosses have been screened for the presence of the transgenic marker.

Conclusion: Microinjection, screening, and successive genetic crosses are ongoing to generate a stable *Dicer-1* knockout line. Establishment of this line will provide a platform to investigate the role of *Dicer-1*-mediated miRNA regulation in *An. gambiae* development, reproduction, survival, and fitness, contributing to a better understanding of the miRNA pathway and its potential relevance to future genetic control strategies.

Keywords: *Anopheles gambiae*, *Dicer-1*, microRNA, CRISPR-Cas9, genetic control

NextGenSIT: A Regulatory-Optimized Bridge Technology Toward Gene Drives

 Governance & Safety

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Mosquito numbers and mosquito-borne disease cases have surged in recent years, driven by rising insecticide resistance, a warming climate, and the spread of invasive mosquitoes. These trends are especially pronounced in Africa, where malaria is now spreading into urban environments via *Anopheles stephensi*. This growing public health challenge has renewed interest in novel genetic approaches such as gene drives. While suppression gene drives are expected to spread and suppress a targeted *Anopheles* species after just a few releases, their self-propagating nature makes regulatory approval contentious, requiring a multi-country framework.

At Synvect, we have developed two biosafe-by-design genetic control tools for *Anopheles gambiae* and *Anopheles stephensi* elimination: NextGenSIT and SEPARATOR. NextGenSIT combines the safety of traditional Sterile Insect Technique (SIT) with the precision of CRISPR gene knockouts. It uses two GM strains – one expressing Cas9, the other guide RNAs – to produce NextGenSIT eggs that develop hands-free into sex-sorted, sterilized males. SEPARATOR enables high-throughput, high-precision sex-sorting of early mosquito larvae and permanently marks mosquitoes with inert, harmless fluorescent proteins.

We argue that NextGenSIT can serve as a regulatory-optimized bridge technology toward gene drives. It uses the same CRISPR components as CRISPR-based gene drives, yet remains fully contained, offering the safety profile of traditional SIT with a regulatory pathway at the single-country level. Open-field trials of NextGenSIT will pave the way for gene drives by building community acceptance, local production capacity and expertise, and regulatory precedent for CRISPR-based mosquito control. Once gene drives are ready for open-field trials, SEPARATOR can then be deployed to scale production and sex-sort male-only releases of suppression gene drives.

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Targeting the X chromosome to develop genetic tools for the control of Malaria vectors

 Governance & Safety

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Vector-borne diseases cause enormous damage, with over 700 million cases worldwide. Transmitted by mosquitoes of the *Anopheles* genus, malaria kills more than 600,000 people a year. To tackle the problem, several vector control strategies have been implemented or proposed, including the use of genetic control. Previous studies have shown that germline specific cleavage of the X chromosome during male meiosis (X-shredding) or the disruption X-linked haploinsufficient genes (X-poisoning) can be used to bias the sex ratio of progenies towards males thereby reducing the number of malaria-transmitting females. My PhD work focuses on the use of CRISPR-Cas9 tools for the functional validation of X-linked genes with putative role in male gametogenesis, hybrid male sterility or female survival that can be targeted to develop novel genetic control tools. Alongside the characterization of candidate genes my work allowed to describe mechanisms of formation and inheritance of DNA mutations derived from CRISPR nuclease expression in the germline providing new knowledge and tools to develop new technologies to suppress malaria mosquito populations and transferrable to other major vector-borne diseases.

Key words: CRISPR cas9, gene, b2 tubulin, deletion, and sterility

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Progress in *Anopheles stephensi* gene drives and modeling

 Research

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Gene drive alleles bias inheritance in their favor, allowing them to quickly spread throughout a population after a small release of transgenic individuals. They could combat vector-borne diseases such as malaria and dengue from mosquitoes by rapidly spreading a cargo gene that blocks pathogen transmission or by directly suppressing vector populations. However, CRISPR gene drives often generate resistance alleles when DNA cleavage is repaired by end-joining instead of homology-directed repair, which impedes the spread of the drive. To overcome resistance allele formation, we generated a multiple-gRNA drive in the invasive urban malaria mosquito *Anopheles stephensi*. It successfully eliminated cage populations of mosquitoes. We've also constructed another drive using a new "toxin-antidote" mechanism that allows confined population modification. These experiments are supported by our computational modeling, which can predict the outcome of gene drive strategies on small and large scales.

Key words: gene drive, homing suppression drive, *Anopheles stephensi*, resistance, computational modeling