BIOBASED INNOVATION AND ENTREPRENEURSHIP BOOTCAMP (BIEB)

Making Ideas Investable

28 July – 8 August 2025

icipe Duduville Campus
Nairobi, Kenya

Organised by:
BioInnovate Africa
Regional Scholarship and Innovation Fund

Contents

Background

The Biobased Innovation and Entrepreneurship bootcamp (BIEB) is organised to enable participants to package their innovative biobased ideas into investable projects. It offers practical hands-on workshops, cocreation of ideas and real-world exposure to commercial biobased industries and regional policy instruments relevant to translate biobased research into value-added goods and services. The Bootcamp is designed to foster collaboration and expose participants to the triple helix model of innovation involving academia, industry and policy actors as important elements of a functional innovation system.

Participants

The participants (bootcampers) are competitively selected from the BioInnovate Africa network of universities and research organisations, and the scholars from the Regional Scholarship and Innovation Fund.

Pitches

A Pitch Event scheduled on the final day showcases the innovative biobased ideas packaged as projects or ventures to an audience of experts, potential investors and funders. The half-day event features 5-minute pitch presentations with feedback, Q & A and networking.

Partners

Experts in various fields such as funding and investment, intellectual property, policy regulation and enterprise development provide the guidance and mentorship. In addition, collaborations with the East African Community (EAC), academic institutions such as the Nelson Mandela African Institution of Science and Technology (NM-AIST), private companies such as A-to-Z Group, Envsol Technology Limited, among others, give the bootcampers a bird's view of innovations driving bioeconomy development in East Africa.

Programme

Day 1 – Stage setting & customer discovery
Day 2 – Develop a value proposition
Day 3 – A day's practicum
Day 4 – Navigate financials, intellectual property and regulatory hurdles
Day 5 – Prepare pitch decks
Day 7 & Day 8 – Field visits
Day 10 – Pitch event

Products

A. Biopesticides

1. BioFungi: Entomopathogenic Fungus

Product description: A biopesticide made from naturally occurring fungi targeting harmful insect pests such as fall armyworm, aphids and bean beetles.

Name of idea bearer: Marcellin Cuma Cokola

Organisation of Affiliation: Université Evangélique en Afrique

Country: Democratic Republic of Congo (DRC)

Bio: Marcellin is an agricultural scientist and entomologist specialising in sustainable pest management and agroecology in smallholder farming systems. A lecturer and researcher at Université Evangélique en Afrique (UEA/Bukavu), D.R. Congo, he focuses on integrated pest management using native entomopathogenic fungi, predators, and parasitoids. His work has informed strategies to control *Spodoptera frugiperda* (fall armyworm) and reduce reliance on chemical pesticides. Actively engaged in international research collaborations, Marcellin promotes sustainable pest control to enhance food security and protect natural resources. He holds a Ph.D. in Agricultural Sciences and Biological Engineering from the University of Liège, Belgium, where his research centred on the ecology and biological control of fall armyworm in South Kivu.

2. Clove and ginger-based

Product description: A biopesticide formulated from clove and ginger extracts to inhibit growth of mycotoxin-producing fungi on stored food products by farmers, food processors, exporters of food commodities, among others.

Name of idea bearer: Esther Rehema Matendo

Organisation of Affiliation: Université Evangelique en Afrique

Country: Democratic Republic of Congo (DRC)

Bio: Esther is a food scientist and lecturer at Université Évangélique en Afrique, D.R. Congo, with over a decade of academic experience. She is a 2021 Mawazo Learning Exchange Fellow and is a beneficiary of Cohort IV BioInnovate Africa Women Scientists Fellowship. She is currently pursuing a Ph.D. in Food Science and Nutrition at Jomo Kenyatta University of Agriculture and Technology, Kenya, focusing on local plant-based treatments and nixtamalization to reduce mycotoxin contamination in maize and groundnuts, addressing critical food safety and public health challenges. She holds a master's degree in Natural Products Technology and Value Chain Addition from Sokoine University of Agriculture, Tanzania, where she researched botanical extracts to combat tomato pests.

Products

3. Aromatic Shield: Essential Oil-Based

Product description: A biopesticide developed from blends of plant-based essential oils with biodegradable and repellent properties leaving no harmful residues on fruits, vegetables and herbal crops of horticulture farmers.

Name of idea bearer: Shallot Tumuhairwe

Organisation of Affiliation: Pharmaceutical Society of Uganda

Country: Uganda

Bio: Shallot is a pharmaceutical scientist and an assistant lecturer in medicinal chemistry at Mbarara University of Science and Technology (MUST), Uganda. She supports applied research through the MUST-Pathological Epidemiology Studies project, promoting herbal and natural product innovations. Her professional experience includes quality assurance at Abacus Parenteral Drugs Limited and roles at Mavid Pharmaceutical Industry and the National Chemotherapeutics Research Institute, specialising in herbal drug development and quality systems. She developed *Shallyz Multipurpose Liquid Soap*, a herbal-based cleaning solution, and *Aromatic Shield*, a plant-based biopesticide that offers farmers a safe, biodegradable alternative to synthetic pesticides. She holds a master's degree in Pharmaceutical Analysis, and a bachelor's degree in Pharmaceutical Sciences from MUST.

B. Biomaterials

4. Seaweed-based Bioplastics

Product description: This is a biodegradable packaging alternative to conventional petroleum-based plastics involving a combination of seaweed-derived carrageenan, vinegar, and glycerine, used as food wrappers, shopping bags and containers.

Name of idea bearer: Judith Temu

Organisation of Affiliation: Tanzania Fisheries Research Institute (TAFIRI)

Country: Tanzania

Bio: Judith is a marine scientist at the University of Dar-es-Salaam, Tanzania, where she contributes to research and laboratory work on aquatic ecosystems and blue economy initiatives. Her work focuses on addressing coastal community challenges, particularly those affecting women seaweed farmers. Motivated by high post-harvest losses and limited market opportunities for seaweed, she developed biodegradable packaging made from seaweed, a sustainable alternative to plastic that adds value to locally cultivated seaweed while advancing environmental protection and economic empowerment. She is currently pursuing a master's degree in aquatic sciences, with a research focus on nutrient quality and contamination analysis of seaweed, and holds a bachelor's degree in Marine Science.

Products

5. GreenGel for modern farming

Product description: Three distinct products namely, EcoGel, EcoGrow and bioplastics which are derived from plant-based starch generated from agricultural waste (peels) of sweetpotato, cassava and irish potato. Ecogel is used as a gelling agent in tissue culture media, EcoGrow bags for potting tissue culture plantlets while bioplastics are used as carrier bags as an alternative to conventional plastics.

Name of idea bearer: Margareth Lupembe

Organisation of Affiliation: Tanzania Agricultural Research Institute (TARI)

Country: Tanzania

Bio: Margareth is a researcher at the Tanzania Agricultural Research Institute (TARI) whose work focuses on molecular diagnostics, plant tissue culture, and bioinnovation to develop sustainable, lab-based solutions that promote environmental conservation and advance scientific knowledge. She is a beneficiary of Cohort IV BioInnovate Africa Women Scientists Fellowship. She collaborates with scientists to address real-world challenges in agriculture, aiming to improve community livelihoods and soil health while fostering sustainable farming systems. She holds a master's degree in Molecular Biology and Biotechnology, and a bachelor's degree in Biotechnology and Laboratory Sciences from Sokoine University of Agriculture, Tanzania.

6. A novel treatment method for Sisal fibre degradation

Product description: A method of treating sisal fibre using calcined bentonite to enhance its durability and used in cement-based composite materials as an alternative to steel and plastic fibres in the construction industry.

Name of idea bearer: Tsion Amsalu Fode

Organisation of Affiliation: NM-AIST

Country: Tanzania

Bio: Tsion is a structural materials scientist and engineer whose research focuses on enhancing the sustainability, environmental performance, and durability of cement and concrete reinforcement materials by integrating natural pozzolanic and biobased alternatives. She has published extensively and holds patents on sustainable construction materials, while also serving as a peer reviewer for over 30 international journals. She is a PASET-RSIF alumna and holds a Ph.D. in Materials Science and Engineering from a joint programme between the Nelson Mandela African Institution of Science and Technology (NM-AIST), Tanzania, and Worcester Polytechnic Institute, USA. She has a master's degree in Structural Engineering from Addis Ababa Science and Technology University and a bachelor's degree in civil engineering from Wollega University, both in Ethiopia.

C. Food and Nutrition

7. HerbalGuard™: A herbal extract for fried and starchy foods

Product description: A herbal-based extract derived from underutilized but potent Ethiopian herbs - koseret, Kesse and tosign - applied directly to frying oils or pre-treatment of starchy foods to reduce acrylamide formation (a known food-processing contaminant) in snack manufacturing and food processing industries.

Name of idea bearer: Daniel Assefa

Organisation of Affiliation: Hawassa University

Country: Ethiopia

Bio: Daniel is a lecturer and researcher at Dilla University, Ethiopia, specialising in food science and technology. His work focuses on phytochemicals, natural antioxidants, and food safety, particularly the use of endemic Ethiopian herbs to reduce acrylamide in fried foods and improve oil stability. His research led to the development of *HerbGuard*, a natural herb extract formulation that enhances the quality, safety, and sensory appeal of fried foods. He collaborates with regional and international partners to promote sustainable food innovation in East Africa. He holds a Ph.D. in Food Science and Technology from Hawassa University, Ethiopia, where his doctoral research explored herb-based bioactive compounds, and a master's degree in Analytical Chemistry from Dilla University.

8. Meal-worm protein enriched food biscuits and animal feed pellets

Product description: A meal-worm protein-enriched biscuit fortified with 15% mealworm protein flour for human consumption and feed pellets for small animals such as rabbits and mice.

Name of idea bearer: Winnie Okeyo

Organisation of Affiliation: Kenya Agricultural Livestock and Research Organisation (KALRO)

Country: Kenya

Bio: Winnie is a research scientist at the Biotechnology Research Institute (BioRI) of the Kenya Agricultural and Livestock Research Organisation (KALRO), under the Arthropod Biotechnology programme. Her work spans arthropod genetics, with a focus on tsetse fly population genetics to inform vector control, and insect biotechnology for alternative protein production. She leads the mealworm laboratory at BioRI, overseeing research on cost-effective feeding substrates for small-scale farmers and developing nutrient-rich food and feed products from mealworm protein. Her vision is to establish the lab as a commercial unit supporting food and nutrition security. She holds a Ph.D. in Biotechnology specialising in arthropod genetics, and her research contributes to sustainable agriculture and alternative protein innovation in Kenya and beyond.

Products

9. Kocho-enriched nutritious food ingredient

Product description: A nutritionally enriched traditional food ingredient 'kocho' – an Ethiopian staple - premixed with nutrient dense pulses such as faba bean, chickpea, orange-fleshed sweet potato (OFSP) and selected spices for low and middle income population in Ethiopia.

Name of idea bearer: Abayneh Agena

Organisation of Affiliation: Hawassa University

Country: Ethiopia

Bio: Abayneh is specialising in improving *kocho*, a gluten-free staple made from the enset plant and consumed by over 20 million Ethiopians. He is the innovator behind nutrient-rich kocho-based products enriched with pulses, orange-fleshed sweet potatoes, and local spices, addressing both micronutrient and macronutrient deficiencies while maintaining taste and shelf life. His work blends traditional knowledge with modern food science to combat malnutrition and promote dietary diversity. He has participated in national and regional innovation programmes. He is a Ph.D. candidate in Food Science and Technology at Hawassa University, Ethiopia. He holds a master's degree in Applied Microbiology and a bachelor's degree in Biology, both from Hawassa University.

10. Biobuggers: Plant-insect burger patties and snacks

Product description: Ready-to-eat burger patties that are plant and insect-based, meat analogues and protein-energy snacks for health-conscious consumers.

Name of idea bearer: Mercy Wilfred Mmari

Organisation of Affiliation: Sokoine University of Agriculture

Country: Tanzania

Bio: Mercy is a food scientist, nutrition researcher, and entrepreneur. She is the founder of NutriYummy BioMeats, a venture creating plant–insect-based meat alternatives that deliver nutrition, taste, and climate-smart solutions. With over a decade of academic and industry experience, she specialises in food product development, nutritional analysis, and sustainable protein research. She is Chairperson of the Tanzania Association of Food Scientists and Technologists, and an alumna of the Mandela Washington Fellowship. She is a PASET-RSIF scholar pursuing her Ph.D. at Sokoine University of Agriculture (SUA), Tanzania, affiliated with the University of Greenwich, United Kingdom, focusing on edible insect ethnography and linking indigenous food knowledge to modern food innovation.

Products

11. An insect-derived natural preservative

Product description: Insect-extracted chitosan used as a natural preservative to extend shelf life intended for use in bakery, biomedical, pharmaceutical, haircare and cosmetic industries.

Name of idea bearer: Marthe Niyibigira

Organisation of Affiliation: Makerere University

Country: Uganda

Bio: Marthe is a researcher in food science and technology with experience in data-driven, community-focused research. She has worked as a Research Assistant with INADES Formation Rwanda, Primson Management Services, CRS-Rwanda, and CNFA-Hinga Wunguke, supporting projects in food and nutrition, public health, and agriculture. Her work includes data collection, analysis, report writing, and stakeholder engagement to inform evidence-based programmes and policies. She is a beneficiary of the Cohort II BioInnovate Africa Women Scientists Fellowship. She holds a master's degree in Food Science and Technology from Makerere University, Uganda.

D. Biopharmaceuticals

12. Umoyo wound cream: Tilapia fish skin-based ointment

Product description: An ointment derived from tilapia fish skin and silver sulphadiazine with antibacterial and wound healing properties for treating human wounds from burns.

Name of idea bearer: Bhahat Zimba

Organisation of Affiliation: Nelson Mandela African Institution of Science and Technology, NM-AIST

Country: Tanzania

Bio: Bhahat is a biomedical engineer, lecturer in Regenerative Medicine at the Malawi University of Science and Technology, and founder of Umoyo Biotech. He focuses on biomaterials and tissue engineering to develop locally sourced, innovative healthcare solutions for Africa. His notable invention, Umoyo Wound Cream, combines silver sulfadiazine with collagen from *Chambo* (Oreochromis lidole) tilapia fish skin to enhance burn healing, promote tissue regeneration, and reduce scarring. Published widely, he champions affordable African-led biomedical innovations and mentors young scientists. Through Umoyo Biotech, he works to commercialise indigenous technologies and improve healthcare access. He is a PASET-RSIF scholar pursuing a Ph.D. in Biomaterials and Tissue Engineering at the Nelson Mandela African Institution of Science and Technology (NM-AIST), Tanzania.

Products

13. Plant-based therapy to lower antibiotic resistance

Product description: A phytopharmaceutical adjuvant derived from Chadian medicinal plants designed to restore effectiveness of conventional antibiotics against multidrug-resistant bacteria among patients.

Name of idea bearer: Abdel-razakh Hissein Hassan

Organisation of Affiliation: SUA

Country: Tanzania

Bio: Abdel-razakh is a scientist affiliated with the Southern African Centre for Infectious Disease Surveillance (SACIDS) Foundation for One Health, focusing on the antimicrobial and antioxidant properties of medicinal plants such as Bauhinia rufescens, Ocimum basilicum, and Salvadora persica used in traditional medicine in Chad. He has published widely on natural products and their potential in addressing global health challenges. A PASET-RSIF alumnus, he conducted part of his doctoral research at the Korea Institute of Science and Technology, gaining expertise in advanced analytical techniques and molecular biology. His research interests include drug resistance, oxidative stress, and natural therapeutics for disease prevention. He holds a Ph.D. in Microbiology, Parasitology, and Biotechnology from Sokoine University of Agriculture (SUA), Tanzania, and a master's degree in biotechnology from Université de Lomé, Togo.

14. MusaHeal: A wound gel

Product description: A gel that uses natural ingredients from 'Kimalindi' banana leaves that is applied on human skin to treat wounds and burns.

Name of idea bearer: Edson Kimario

Organisation of Affiliation: NM-AIST

Country: Tanzania

Bio: Edson is a tutor and academic officer at Amenye Health Training Institute, Tanzania, teaching diploma in Clinical Medicine and Medical Laboratory Science, while overseeing academic affairs. He has previously served as a registered laboratory scientist at Mbeya Regional Referral Hospital, and gained broad experience across laboratory departments, from patient sample preparation to diagnostic result dissemination. His research interests include molecular theranostics, antimicrobial resistance gene analysis using bioinformatics, and developing sustainable health solutions from natural resources. He is passionate about integrating scientific knowledge with practical, community-centred applications. He is pursuing a master's degree in Molecular Biomedical Engineering at the Nelson Mandela African Institution of Science and Technology, and holds a bachelor's degree in Medical Laboratory Sciences from Kilimanjaro Christian Medical University College, Tanzania.

15. Gash Care: A BioNanoGuard cream

Product description: A next-generation antimicrobial cream made from bees wax and used for cosmetic and pharmaceutical functions for huma skin repair, wound repair and infection control respectively.

Name of idea bearer: Gershom Muganga

Organisation of Affiliation: Pharmaceutical Society of Uganda

Country: Uganda

Bio: Gershom is a pharmaceutical scientist and junior lecturer at Mbarara University of Science and Technology (MUST), Uganda, where he also mentors research in pharmaceutical analysis and natural product innovation. He has contributed to over 25 multidisciplinary projects, leading the development and quality control of products such as herbal pessaries, pain-relieving ointments, herbal capsules, wound-healing sprays, and excipients like microcrystalline cellulose. His innovations include *Gash Care*, a cosmeceutical brand made from locally sourced botanicals to promote safe, plant-based skin care. He previously served as a research guest at the University of Leipzig, Germany, contributing to herbal wound therapy studies. He holds a master's degree in Pharmaceutical Analysis, and a bachelor's degree in Pharmaceutical Sciences from MUST.

E. Wastewater Treatment

16. A wastewater treatment technology for vehicle washing bays

Product description: A locally designed technology of treating wastewater from vehicle washing bays based on a constructed wetland system consisting of vertical and horizontal flow systems that remove contaminants and pollutants from wastewater.

Name of idea bearer: Baker Kansiime

Organisation of Affiliation: Kyambogo University

Country: Uganda

Bio: Baker is a water technician, environmental engineer, and conservationist who serves as an Engineer at the National Water and Sewerage Corporation, Uganda, overseeing asset management operations. He previously led the Water Loss Prevention Unit, reducing non-revenue water and providing technical guidance on water loss management. He is a part-time lecturer on environmental and industrial engineering at Kyambogo University, Uganda. He is a member of the Uganda Institute of Professional Engineers, the Network for Education and Multidisciplinary Research Africa (NEMRA), and the Safety and Health Association of Uganda, and is pursuing corporate membership with the Engineering Registration Board. He holds a master's degree in Conservation and Natural Resource Management, a bachelor's degree in Environmental Engineering and Management, and a diploma in Water Engineering.

Products

17. Anaerobic digestion of organic waste

Product description: A method based on anaerobic co-digestion that converts organic wastes into biogas for clean energy and biofertilizers for agricultural purposes and can be used by municipal waste authorities, wastewater treatment facilities, slaughterhouses and urban/peri-urban farmers.

Name of idea bearer: Abraham Erodi

Organisation of Affiliation: Makerere University

Country: Uganda

Bio: Abraham is a quality control officer at the National Water and Sewerage Corporation, Uganda, specialising in analytical testing, water quality management, and process optimisation. He has extensive experience in wastewater treatment, microbial and physicochemical analysis, and sustainable waste management, with a focus on integrating research, laboratory analysis, and operational improvements in municipal and industrial facilities. He has developed an anaerobic digestion solution that converts organic waste into biogas for clean energy and nutrient-rich biofertilizer, addressing waste, energy, and soil fertility challenges in urban and peri-urban areas. He holds a master's degree in Biochemistry and a bachelor's degree in Biochemistry and Chemistry, both from Makerere University, Uganda.

18. A batch adsorption reactor system to remove heavy metals from wastewater

Product description: An adsorption method that removes heavy metals from industrial wastewater from wastewater treatment facilities, mining industries, metal plating companies, domestic and municipal water boards, among others.

Name of idea bearer: Jonas Bayuo

Organisation of Affiliation: C.K. Tedam University of Technology

Country: Ghana

Bio: Jonas is a lecturer and entrepreneur at the C. K. Tedam University of Technology and Applied Sciences, Ghana. His research focuses on adsorption and biosorption, water and wastewater treatment, biomass conversion, and materials engineering. He has authored over 30 peer-reviewed articles, three book chapters, and presented at more than 25 conferences. His work has received over 1,150 citations with an H-index of 17, and he serves as an editor and reviewer for several high-impact journals. He is a member of the Royal Society of Chemistry and the African Materials Research Society, and has received multiple research grants and fellowships. He is a PASET-RSIF alumnus and holds a Ph.D. in Materials Science and Engineering, two MPhil degrees and a bachelor's degree in Science Education.

F. Biomimicry

19. Insect inspired fashion

Product description: A range of insect-inspired fashion products such as dresses, tops, accessories, and jewellery designed to celebrate Africa's rich insect diversity and inspire biodiversity conservation.

Name of idea bearer: Elizabeth Siago Kusia

Organisation of Affiliation: International Centre of Insect Physiology and Ecology, *icipe*

Country: Kenya

Bio: Elizabeth is an insect scientist and entrepreneur, passionate about sustainable agriculture, biodiversity conservation, and creative storytelling. She has worked extensively in entomology across Africa and is the founder of SIAGO, a Nairobi-based fashion brand producing elegant plus-size clothing that empowers women to dress with confidence. She also created *BugTales by Khanga*, a unique initiative that uses khangas inspired by insects, Swahili sayings, and local culture to raise awareness about insect biodiversity through wearable art. She blends science and fashion to make biodiversity conservation relatable and engaging. She holds a Ph.D. in Agricultural Sciences (Entomology) from the University of Bonn, Germany.

G. Biodiversity Conservation

20. Value-added use of 'Umukuza' indigenous plant

Product description: Restoration of 'Umukuza' indigenous plant to contribute towards biodiversity conservation, while adding value to its dried fruit, known as the 'calabash,' to promote Burundian culture among tourists.

Name of idea bearer: Solange-Ange Bacinoni

Organisation of Affiliation: University of Burundi

Country: Burundi

Bio: Solange is a 22-year-old and vice-president of the Environment Club at the University of Burundi, a platform that fosters engagement and awareness on environmental issues. She is also an artist specialising in crochet, trained by the American Corner, in artisanal techniques and creative entrepreneurship. In 2024, she won third place in the inaugural innovation competition organised by the University of Burundi, showcasing her creativity and initiative. She is currently undertaking a professional internship as part of the FICAP project and holds a bachelor's degree in Biological Sciences from the University of Burundi.

Facilitators

1. Linda Mathenge – Growth Africa, Kenya
2. Kanana M. Njuguna – WWF Kenya
3. Benjamin Mwanza – Villgro Africa, Kenya
4. Robert Karanja – BioLinx Africa, Kenya
5. Concilia Were – Kenya Industrial Properties Institute (KIPI)
6. Mark Ameyo – Kenya Climate Ventures
7. Annick Verween – Biotope by VIB, Belgium
8. Julius Ecuru – *icipe*, Kenya
9. Faith Amatika – *icipe*, Kenya
10. Cynthia Orang'o – *icipe*, Kenya
11. Shira B. Mukiibi – *icipe*, Kenya
12. Anthony Mshandete, NM-AIST, Tanzania
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