



ADELEKE, Babatunde Ayoade

BAgric(Ulbadan), MSc.....Biology



THESIS: Bioeconomic Feasibility of Aquaponics in South Africa: Leapfrogging for Sustainable Development of Freshwater Aquaculture

CITATION: The dissertation provides insights on successes and areas for improvement of aquaculture in Africa and explores aquaponics' potential as an alternative small and medium income-generating farming system in South Africa. Aquaponics was evaluated in terms of bioeconomic feasibility, as a potential leapfrog technology to facilitate rapid development, attain food security and promote local economic development. Aquaponics thus presents potential to drive sustainable and feasible food production in South Africa.

SUPERVISORS: Dr DV Robertson-Andersson, Mr GK Moodley and Dr SM Taylor

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ADETUNJI, Ademola Emmanuel

BSc(UAdo-Ekiti), MSc(OAU).....Biology

THESIS: Physiological and Biochemical Investigations into the Reinvigoration of Deteriorated *Brassica oleracea* L. (Cabbage) and *Lactuca sativa* L. (Lettuce) Seeds with Antioxidants and Inorganic Salt Solutions

CITATION: Ageing-induced loss of orthodox seed vigour and viability during long-term storage compromises crop productivity. Ademola Emmanuel Adetunji's doctoral research focused on reinvigorating deteriorated cabbage and lettuce seeds with antioxidants and inorganic salt solutions. The study offered new physiological and biochemical insights for using seed pre-hydration treatments for mitigating poor stand establishment and also recommends successful reinvigoration of seeds stored for long-term in gene banks to ensure food security.

SUPERVISORS: Dr B Varghese, Professor S Naidoo and Professor NW Pammenter

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AREGBESOLA, Oladipupo

BSc(UAdo-Ekiti), MSc(OAU).....Microbiology

THESIS: Biodegradation of Pentachlorophenol by *Bacillus tropicus* Isolated from Activated Sludge of a Wastewater Treatment Plant in Durban South Africa

CITATION: : In his PhD, Oladipupo Abiodun Aregbesola investigated the catabolic pathways involved in the degradation of pentachlorophenol (PCP) by an indigenous bacterial isolate. To date, the study has produced four publications, including novel reports on the biological functions of the important enzymes in the pathways. Findings from the study are promising for the development of microbial system for cost-effective and sustainable treatment of sites polluted with PCP and/or its congeners.

SUPERVISORS: Professor AO Olaniran and Dr MP Mokoena

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CHAMBERS, Mark John

BSc, BScHons.....Biochemistry

THESIS: The Design and Identification of β -secretase (BACE1) Allosteric and Active site Ligands

CITATION: Mark Chambers produced a large body of work in which he delineated parameters influencing the thermal stability of the Alzheimer's-relevant protein BACE1, provided the first definitive measurement of the protein's thermal stability in mammalian and bacterial cells, and devised an original screening assay through which he identified three novel BACE1 binding ligands. His work, which was recently published, offers unique perspectives that will facilitate the design of effective BACE1 inhibitors.

SUPERVISOR: Dr R Hewer

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COZIEN, Ruth Jenny

BSc(UNISA), BScHons.....Ecological Sciences

THESIS: Pollinator-driven Divergence among Populations of a Self-fertilizing Lily, *Hesperantha coccinea* (Iridaceae)

CITATION: The prevalence of self-fertilization in plants with ecologically specialized pollination systems is a major puzzle in biology. Ruth Cozien demonstrated that the river Lily *Hesperantha coccinea* comprises two ecotypes, locally adapted to butterfly and long-proboscid fly pollinators, respectively, yet the plants are also capable of self-fertilization. She showed that the combination of delayed selfing with adaptations for cross-pollination offers plants a “best of both worlds” evolutionary strategy.

SUPERVISOR: Professor SD Johnson

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DELSINK, Audrey Katrina

BTech(TSA), MSc.....Biology

THESIS: African Elephant (*Loxodonta africana*) Spatial Ecology, Population Control and Human Interactions: Implications for Management

CITATION: Audrey investigated approaches to management of endangered African elephants, using understanding gained from studying their movements and behaviour. She demonstrated that immunocontraception implementation has no social or behavioural consequences, the importance of considering the large home range of elephants when addressing localised problems, and she developed a novel, risk assessment approach for effective pre-emptive conflict mitigation. Incorporating elephant spatial ecology into management planning contextualises and improves management applications and outcomes.

SUPERVISOR: Professor RH Slotow

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FATOKUN, Kayode

BAgric(OAU), MSc(UNIZUL).....Biology

THESIS: Cathodic Water Invigoration of Deteriorated Orthodox Seeds – Implications on Subsequent Plant Growth

CITATION: Ageing-induced loss of orthodox seed vigour and viability during long-term storage is inevitable. Kayode Fatokun’s doctoral research focused on reinvigorating deteriorated seeds of few wild and agricultural species with cathodic water, an electrolysed form of calcium magnesium solution. The study offered new physiological and biochemical insights into the use of cathodic water in invigorating debilitated seeds and using cathodic water in improving the yield of orthodox-seeded species.

SUPERVISORS: Professor RP Beckett, Dr B Varghese and Professor NW Pammenter





GOVENDER, Ashrenee

BSc, BScHons, MSc.....Genetics

THESIS: DNA Metabarcoding and Zooplankton Enhances Community-Level Analyses of Connectivity in Marine Pelagic Environment

CITATION: Zooplankton are abundant and diverse marine organisms that form ecologically important communities. They are well-suited for the biomonitoring of ecosystem health and biodiversity. For her Ph.D., Govender used new molecular techniques such as DNA metabarcoding to monitor and assess marine zooplankton along the east coast of South Africa. The research carried out by Govender was timeous and cutting edge and has contributed to the growing field in metabarcoding and zooplankton research.

SUPERVISORS: Dr S Willows-Munro, Professor JC Groeneveld and Miss SP Singh

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GUMEDE, Silindile Thobeka

BSc, BScHons, MSc.....Ecological Sciences

THESIS: Taxonomic, Functional and Meta-population Dynamics of the Avian Communities in selected Southern Mistbelt Forests of southern KwaZulu-Natal and the Eastern Cape, South Africa

CITATION: Anthropogenic landscape transformation results in reduced natural habitats, such as forests. This is challenging specialist species in fragmented habitats and influences the composition and distribution of avian species assemblages. In her timely, multifaceted study, Gumede determined scores of functional diversity measures of avian communities present in understudied Southern Mistbelt forest patches and patch connectivity to show protection of natural forest habitat in diverse landscapes is critical for avian communities' persistence.

SUPERVISORS: Professor CT Downs, Dr DA Ehlers Smith and Dr YC Ehlers Smith

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KADER, Farzeen

BSc, BScHons, MSc.....Genetics

THESIS: Development of a Novel Multiplex MS-SNuPE Assay for Identification of Human Body Fluids and Assessment of DNA Methylation Differences between Ethnic Groups in KZN, South Africa

CITATION: Ms Farzeen Kader's research was in the interesting field of forensics. She developed a method to simultaneously identify forensically relevant body fluids like blood, saliva and semen using methylation markers. In a first ever report, she looked at methylation differences in blood and saliva of diverse South African population. Her thesis obtained excellent reviews with one of the examiners stating it as one of best thesis examined in years.

SUPERVISORS: Dr M Joshi, Professor AO Olaniran and Dr AJ Niehaus

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LA GRANGE, Louis Jacobus

MSc.....**Biology**



THESIS: *Trichinella* Infections in Wildlife in the Greater Kruger National Park, South Africa: Unravelling Epidemiological Gaps with Special Emphasis on Infectivity of *Trichinella zimbabwensis* in Selected Tropical Fishes

CITATION: Mr Louis J. La Grange undertook a comprehensive study on the epidemiology of *Trichinella* infections (a zoonotic parasite) in wildlife in the Greater Kruger National Park of South Africa. The study was a combination of field and laboratory experiments. His study unravelled some important epidemiological gaps which include identification of new vertebrate wildlife hosts as well as infectivity of the parasite to tropical fishes.

SUPERVISOR: Professor S Mukaratirwa

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MKIZE, Lwamkelekile Sitshilelo

BSc, BScHons, MSc.....Genetics



THESIS: Population Genetic Structure of Genetic Loci Conferring Hardiness in Nguni Crossbred Cattle from Selected KwaZulu-Natal Regions in South Africa

CITATION: The genetic basis of genes conferring hardiness and robustness in South African Nguni crossbred is poorly understood. The candidate established the comprehensive evolutionary maternal lineage and population genetic structure of the Nguni crossbred cattle. He also discovered novel Single Nucleotide Polymorphisms in genes that confer heat tolerance. Lwamkelekile unravelled novel genes linked to hardiness. Two research articles were published internationally from this research and one is currently under review.

SUPERVISOR: Dr OT Zishiri

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NCUBE, Keabetswe Tebogo,

BTech(TUT), MSc(UNISA).....Genetics

THESIS: Gene Expression Profiling of South African Indigenous Goat Breeds using RNA-Seq Technologies in Search of Genes Associated with Growth and Carcass Quality Traits

CITATION: Keabetswe Ncube used customised genomics and transcriptomics strategies to exhaustively characterise the genomic mechanisms associated with growth and meat quality in goats. Her thesis explored the effects of breed type and production system and identified genes and genetic mechanisms that enable indigenous goats to produce optimally under the various environmental conditions of South Africa. Keabetswe's study findings are necessary for goat breeding and genetic improvement initiatives

SUPERVISORS: Dr FC Muchadeyi and Mr EF Dzomba

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NGOROYEMOTO, Nelson

Licenciate Edu(Enrique Jose Varona U), BSc Hons(UZim), MSc(Bindura U)..... Botany

THESIS: The Effect of Organic Biostimulants and the Mode of Application on the Growth and Biochemical Composition of *Amaranthus hybridus* L.

CITATION: Mr Ngoroyemoto investigated *A. hybridus*, a leafy vegetable to improve the crop for introduction into commercial agriculture. Nelson's investigation included, inorganic nutrients and, five biostimulants (some together with microorganisms). Nelson through hard work and insight showed that, all five biostimulants and the interaction of microbes with a seaweed biostimulant, improved the growth *Amaranthus*, making it suitable for human consumption. Nelson published three papers in international journals from his research.

SUPERVISORS: Professor J Van Staden, Professor JF Finnie and Dr M Kulkarni

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PEREIRA DE MIRANDA, Everton Bernardo

BSc(UFRRJ), MSc(UFRRJ).....Ecological Sciences

THESIS: Building a Conservation Strategy for the Harpy Eagle in the Amazon Forest

CITATION: The harpy eagle is the Earth's largest eagle and is considered a flagship species for Amazon Forest conservation. Harpy eagles are threatened by poaching and habitat loss. As highlighted by the examiners, Miranda's study was so comprehensive in scope and transcended classic raptor biology in so many ways that it makes a valuable contribution to the raptor literature, ecological literature, and eagle conservation. Each chapter is either published or submitted.

SUPERVISORS: Professor CT Downs and Professor CA Peres

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RAMDAS, Veshara

BTech(NMMU), MHSc(NMMU).....Microbiology

THESIS: Development of High-value Product Prototypes Derived from *Bacillus licheniformis* for the Road Construction Industry

CITATION: Current commercial stabilisers available for application on different soil types for rural road construction is limited. This project focused on the development of a novel bio-based solution using an indigenous *Bacillus* spp. that is effective. This proposed stabilisation technology addressed specific obstacles for in situ soil and improves their structural properties. This work forms the basis of the development of enhanced bio-based stabiliser products for application in the road sector.

SUPERVISORS: Dr SO Ramchuran and Professor S Mukaratirwa

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SANUSI, Adeyemi Isaac

BTech(FederalUTech), MTech(FederalUTech.....Microbiology

THESIS: Impact of NanoBiocatalysts on *Saccharomyces cerevisiae* Metabolism for Ethanol Production: Process Optimization, Kinetic Studies and Preliminary Scale-up

CITATION: Isaac Adeyemi Sanusi investigated the impact of nano-size catalysts on *Saccharomyces cerevisiae* metabolism for ethanol production. He developed the optimal process conditions for bioethanol production from potato wastes in the presence of nano-size catalysts. Four papers from this research have been published in the world's top journals, including Catalysis Letters and Process Biochemistry, and a book chapter. The knowledge generated will strengthen the country's manufacturing economy for biofuels from wastes.

SUPERVISOR: Professor EB Gueguim Kana

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SINGH, Sarisha

BSc, BScHons, MSc.....**Microbiology**

THESIS: Polyhydroxyalkanoate Production by *Bacillus thuringiensis* – An Aspect of Biorefining Pulp and Paper Mill Sludge

CITATION: Ms Singh explored the conversion of pulp and paper mill waste to economically valuable biodegradable bioplastic polymers. She pretreated the waste and enzymatically hydrolysed it to a glucose-rich feedstock used in fermentation by *Bacillus thuringiensis*. Response surface methodology was used to optimize waste hydrolysis and batch and cyclic fed batch fermentations. The polymers were comprehensively characterized and demonstrated desirable properties for the manufacture of biodegradable plastics.

SUPERVISORS: Dr R Govinden, Professor K Permaul, Professor BB Sithole and Mrs P Lekha

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STREICHER, Jarryd Peter

BSc, BScHons.....Ecological Sciences



THESIS: Aspects of the Ecology of Three Mongoose Species along a Rural-urban Landscape Gradient of KwaZulu-Natal, South Africa

CITATION: Many small carnivore species are of particular concern for conservation because of their elusive behaviour, diminutive size and crepuscular habits. There was little understanding of the ecology of mongoose species in KwaZulu-Natal. Streicher used a range of techniques to make an exceptional contribution to the knowledge gap and insight into the ecology of three species of mongooses and how they persist across KwaZulu-Natal's anthropogenically modified habitats (farmlands and urban).

SUPERVISOR: Professor CT Downs

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TREDGOLD, Heather Rayne

BSc, BScHons, MSc.....Microbiology

THESIS: Diversity of Quorum Sensing Pherotypes amongst Ecotypes of Plant-Associated *Bacillus subtilis sensu lato* Isolates

CITATION: Ecotype specific quorum-sensing found amongst related bacteria is considered a significant driver of niche adaptation. Heather's research presents the first description of ecotype diversity and pherotype variation found within plant-associated *Bacillus subtilis sensu lato* strains. Several novel ecotype groupings and pherotype variants were distinguished providing evidence of unique ecotypes adapted to localised conditions. These findings have significant implications for microbial-based plant-growth promotion applications.

SUPERVISORS: Dr R Hewer and Dr CH Hunter

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WAMBUA, Sammy Musee

BSc(UNairobi), MSc(ULondon).....Biology

THESIS: Metagenomics Assessment of Anthropogenic Impact on Coral Reef-associated Microorganisms on the Kenyan Indian Ocean

CITATION: Dr Wambua has contributed an important milestone to East African microbiological knowledge, with the first critical evaluation of anthropogenic effects on the microbiomes of coral reefs. His work is leading the approach to microbiome evaluation on the coral reefs of the Western Indian Ocean.

SUPERVISORS: Dr AHH Macdonald and Dr SM De Villiers





XIAO, Xin

BSc(JXAU), MSc(FAFU).....Biochemistry

THESIS: Comparative Antidiabetic Effects and Mechanisms of Actions of Five Chinese and South African Indigenous Teas

CITATION: In this thesis, the candidate made a significant contribution in the area of alternative medicine and type 2 diabetes by examining the antioxidative and antidiabetic potentials of some widely consumed Chinese and South African indigenous teas. Results of this research will help diabetics to choose better antidiabetic teas and to develop tea-based food supplements. A number of papers have been published from this thesis in the international peer reviewed journals.

SUPERVISOR: Professor MS Islam

