

MAKERERE UNIVERSITY

63rd GRADUATION BOOKLET

The Principal, College of Engineering, Design, Art and Technology to present the following for the

Conferment of the Degree of Doctor of Philosophy (Civil Engineering)

KALIBBALA Mpagi Hebert

“Removal of Natural Organic Matter and Trihalomethanes Formation Control in Water Treatment”

Mr. Kalibbala investigated the applicability and performance of volcanic ash, pumice and Moringa as indigenous materials in the treatment of drinking water. Surface water sources naturally contain organic materials which if subjected to chlorine can result in the formation of by-products some of which have been reported to cause cancer. Therefore his study focused on how to removal the natural organic matter with minimal formation of the unwanted by-products during water treatment. He found the materials investigated to be effective in the removal of both iron and natural organic matter at pre-treatment level of drinking water. The results from the study are proven, low-cost interventions that have the potential to improve on the provision of safe water to the communities in the developing world. The study was funded by Sida and experiments were undertaken at National Water & Sewerage Corporation waterworks at Masaka and Ggaba. The supervisors were: Prof. Prof. Elzbieta Plaza, Assoc. Prof. Olle Wahlberg, Dr. Rose Kaggwa and Dr. Maimuna Nalubega

Conferment of the Degree of Doctor of Philosophy (Civil Engineering)

KIZZA Michael

“Uncertainty Assessment in Water Balance Modeling for Lake Victoria, Makerere University, Kampala”

Mr. Kizza’s research addressed issues of data quality in water balance modeling for Lake Victoria basin. Analyzing the hydrology of Lake Victoria is constrained by limitations of data in terms of quantity and quality, both of which exhibit temporal and spatial variability. A spatially detailed gridded rainfall dataset for the lake basin was derived for the lake basin. Rainfall uncertainty assessments were based on accounting for errors in land rainfall interpolation and lake rainfall regression. Catchment inflows were estimated using various techniques for analysing gauged and ungauged basins. The studies provide a platform for carrying out assessments for utilisation of water resources in Lake Victoria basin. Such studies include lake regulation for optimum hydropower production, water resource utilisation and land-use or climate change studies. The research was funded by Sida/SAREC Project.

Conferment of the Degree of Doctor of Philosophy (Civil Engineering)

ZZIWA Ahamada

“Strength Characterization of Timber for Building Construction in Uganda”

Mr. Zziwa investigated strength properties of 17 timbers used for building construction; proposed a timber strength classification system comprising four classes: SG4, SG8, SG12 and SG16; and developed non-destructive mechanism for predicting timber flexural behavior. The study was mainly experimental and analytical with aspects of numerical modeling using COMSOL Multi-physics. The study findings have potential to: enhance utilization of timbers on market, aid in design of structures for durability and safety purposes, increase value of lesser-known (non-traditional) timbers and consequently lead to advanced use of wood as a construction material. The non-destructive device developed is a major step towards faster non-destructive strength evaluation techniques using new NDE parameters. NORAD and Carnegie Co-operation of New York are acknowledged for funding the study. Professor J. A. Mwakali and Dr. Y.N. Ziraba are also acknowledged for supervising the study.

The Principal, College of Engineering, Design, Art and Technology to present the following for the

Conferment of the Degree of Doctor of Philosophy (Mechanical Engineering)

MUKASA Nobert

“Degree of Automation in the Machine Tool Driven Manufacturing Industry in Developing Countries, the Case of Uganda”

Mr. Mukasa undertook to discern the incentives and obstacles to the development of the machine tool driven manufacturing industry in a developing country. Widespread lack of global competitiveness and near stagnated growth characterised this industry. The study built models using robust indicators it developed to measure the penetration of advanced manufacturing technologies. Instrumental to investment in hardware technologies were the skills of blue collar workers, engineers and managers. Chief Executive Officers and environmental issues formed strong influences while, competitive advantage formed the strongest strategic motivation amongst Ugandan firms. In addition intangible factors presented formidable barriers to the adoption and penetration of AMT's. The study recommended policy fostering capacity building, local consumer protection and formidable labour and IPR laws. It emphasized the need for strategic choices between policies that support long term objectives associated with locally owned firms and those that support short term strategies which favour foreign owned firms.

The Principal, College of Engineering, Design, Art and Technology to present the following for the

Conferment of the Degree of Doctor of Philosophy (Electrical Engineering)

OTINE Charles Daniel

“HIV Patient Monitoring Framework Through Knowledge Engineering”

Mr. Otine's research developed a structure of using knowledge engineering to enhance HIV patient monitoring in the Ugandan context. It was motivated by the challenge of monitoring Antiretroviral Therapy (ART) in a resource constrained setting, with high ratio of patients to care givers and need for clear strategic decision support systems for Antiretroviral drug supply management. Participatory methodology was used to develop a dimensional model for aggregating HIV data captured during ART. Drug prescription and periodic medical checks on ART patients were modelled in open source software. Analysis techniques were developed with the capability of forecasting the patient's viral load and predicting patients at risk of experiencing

treatment failure with 83% accuracy. HIV/AIDS caregivers can use the tool to guide the process of monitoring patients and take remedial action when necessary. The study was supervised by Dr. Samuel Baker Kucel, Makerere University and Prof. Lena Trojer, Blekinge Institute of Technology (BTH), Sweden. We acknowledge financial support from SIDA.

The Principal, College of Engineering, Design, Art and Technology to present the following for the

Conferment of the Degree of Doctor of Philosophy (Architecture)

NAMUGANYI Lilian (Ms)

Conferment of the Degree of Doctor of Philosophy (Architecture)

OMOLO-Okalebo Fredrick

“Evolution of Town Planning Ideas, Plans and their Implementation in Kampala City 1903-2004”

Mr. Omolo–Okalebo through a descriptive and exploratory approach, and by review and deduction of archival and documentary resources, supplemented by empirical evidence from case studies, traced, analysed and described the historic trajectory of town planning events in Kampala City, Uganda, since the inception of modern town planning in 1903. The study was motivated by the enormous knowledge gap on the values, ideas, ideologies and philosophies that informed planning at each epoch and how these, if implemented, have given physical expression in Kampala’s urban space. The research demonstrates intellectual autonomy and disciplinary rectitude and contributes to the broad knowledge and systematic understanding of planning events since its inception. The research concludes that Planning should be based not on the imagined ideological aims of the “sophisticated” elite whose interest will very often be at variance with those of the ordinary man, but should touch and concern the real conditions and needs of people of the area in question; a need for closer coordination between economic planning and physical planning; a move towards strategic and integrated planning involving appropriate budgeting and financing.

Conferment of the Degree of Doctor of Philosophy (Geomatics)

MAZZI Lydia Kayondo (Ms)

“Geographical Information Technologies – Decision Support for Road Maintenance in Uganda”

Ms. Mazzi’s research developed a Geographical Information Systems data model for road maintenance in Uganda. It was motivated by the underutilization of Geographical Information Technologies (GITs) for data collection, management, analysis and presentation in the road maintenance sector and hence focused on developing a methodological framework geared at spearheading their enhanced use. This participatory research involved stakeholders through interviews, focus group discussions, data modeling and workshops. The need of explicitly defined linear and location referencing systems and points respectively for the road network is the main conclusion from the research. The major recommendation is inclusion of a GIT policy component within the national ICT policy. The sector will benefit from evidence based

prioritization of road maintenance using well-structured data from the model. Ms. Mazzi acknowledges Sida for funding together with the supervisors, professors Tickodri Togboa of Makerere and Gerhard Bax from BTH Sweden.