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MECHANICAL ENGINEERING DEPARTMENT

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PROFILE

I am currently a lecturer and research lead for Automobile Engineering research and teaching at The Brew-Hammond Energy Center of the Kwame Nkrumah University of Science and Technology (KNUST). I hold an MSc degree in Automobile engineering from Kingston University, London since 2009 with a specialisation in electric vehicles. In Kingston university, i studied the effect of energy storage and vehicle architecture on fuel consumption of hybrid-electric vehicles as my thesis. I completed aPh.D. and BSc in Mechanical Engineering from Kwame Nkrumah University of Science and Technology, Ghana in 2016 and 2005 respectively. My Ph.D thesis was based on the effect of biodiesel-biodiesel fuel mixture on engine performance. I have since undergone extensive training on electric vehicle planning by Pmanifold in India where i studied how to plan, maintain, purchase and project total cost of operation of any electric vehicle fleet. With regards to vehicle standards, I am the current Chairman of the Technical Committee on Vehicle Standards and Homologation for Ghana Standards Authority. This committee developed the 26 vehicle standards for M1, M2 and N1 vehicles being used in Ghana today. I am also a member (expert consultant) of the Technical Committee (TC 59) of the African Organization for Standardization (ARSO). The TC 59 has harmonized vehicle standards in Africa. I had the privilege of developing the petrol and diesel fuel standard for Africa. I have provided short-term consultancy services for the E4D VET TOOLBOX project for GIZ on two separate projects in 2018 and 2019. In this project I worked with industry stakeholders and international experts from Germany to develop skills gap analysis for the Automobile Industry in Ghana. My core expertise include electric vehicles (e-mobility), engine performance including emissions with several publications to my credit. I have strong leadership abilities honed as a head of department, dean, project leader and in many other international capacities.



RELEVANT WORK EXPERIENCE

2018 -
Present

**CHAIRMAN/VEHICLE STANDARDS & HOMOLOGATION
GHANA STANDARDS AUTHORITY**

- Worked with National Stakeholders including Driver and Vehicle Licensing Authority, Ministry of Transport, National Road Safety Commission, Motor Traffic and Transport Department, Environmental Protection Agency and 30 other stakeholders in the Automotive industry to prepare Ghana's first vehicle standards on homologation of new vehicles, roadworthiness standards, fuel standards and others.
- Facilitated decision-making by building consensus and developing solutions.
- Advised Ghana Standards Authority on Vehicle Standards to adopt
- Chaired shareholder meetings, disseminating information and fielded questions.
- Conducted research on emerging trends within industry and capitalized on finds to develop new products, services and strategies.

2019 –
Present

**MEMBER/TECHNICAL COMMITTEE ON AUTOMOTIVE STANDARDS
AFRICAN ORGANIZATION FOR STANDARDIZATION (ARSO)**

- Worked Work as Automotive expert on Vehicle Technical Committee (ARSO TC 59) to harmonize and develop vehicle standards for Africa
- Drafted numerous vehicle standards including fuel standards, roadworthiness standards, homologation standards for Africa
- Provided technical leadership on vehicle subcommittees.
- Group leader for electric mobility and alternative fuels

2020

**NATIONAL EXPERT/E4D VET TOOLBOX PROJECT FOR NVTI
GIZ-GHANA**

- Advised National Vocational and Technical Institute (NVTI) on necessary steps for Automotive Mechatronics Curriculum
 - Developed occupational and competence standards for implementation of Automotive Mechatronics at levels II and III.
 - Developed Automotive Mechatronics according to CBET methodology following effective consultation meetings with the private sector stakeholders.
 - Provided monitoring data according to the VET Toolbox standards
 - Organized stakeholders' workshop with Automobile Dealerships and Garages in Ghana
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WORK EXPERIENCE

2019

NATIONAL EXPERT/E4D VET TOOLBOX PROJECT FOR NABPTEX GIZ-GHANA

- Identified and analyzed existing skills forecasting methods in Ghana to assess skills gap in the Automotive Sector in Ghana
- Co-facilitated workshops with stakeholders
- Negotiated with stakeholders in Industry and government agencies to assist in the development of the curriculum
- Assessed all Automotive Engineering laboratories of All Technical Universities in Ghana
- Supported the implementation of training workshops to build capacity of NABPTEX Staff
- Organized interviews and appointments for the mission
- Delivered HND Automotive Engineering curriculum using the Competence Based Approach for NABPTEX

2021

RELEVANT TRAINING CERTIFICATION

- successfully passed the practical course on Electric Bus and Planning Optimization organised by PMANIFOLD and obtained certification awarded by the Automotive Skills Development Council (ASDC) of India

2018 –
2019



EDUCATION

2011-
2016



Ph.D. MECHANICAL ENGINEERING

KWAME NKURUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY/KUMASI

My thesis was engine performance of biodiesel-biodiesel blends in a compression ignition diesel engine. I modified an engine to run on Palm kernel oil, coconut oil and Jatropha biodiesel and blends.

2008-
2009



MSC AUTOMOTIVE ENGINEERING (with specialization in electric vehicles)

KINGSTON UNIVERSITY/LONDON UK

My thesis was drive-cycle performance of hybrid-electric vehicles. I worked on estimating the various driving powertrains of hybrid-electric vehicles and their contribution to performance.

2001-
2005



BSC MECHANICAL ENGINEERING

KWAME NKURUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY/KUMASI



MEMBERSHIP OF PROFESSIONAL BODY

2018-
2019



**CHAIRMAN/COMMITTEE ON EDUCATION AND TRAINING
INSTITUTION OF ENGINEERING AND TECHNOLOGY, GHANA (IET)**

- Ensured existing training courses and requests for new course development are free of conflict of interest and technically sound
- Drafting of annual program for education and training of IET.
- Drafting of budget for annual education and training for IET
- Recruit trainers for seminars
- Advertise training programs for the year
- Develop policies, agreements and other documentation required to support training of IET members
- Develop detail program for continuous program development of IET members.

2018-
2019



**COUNCIL MEMBER
INSTITUTION OF ENGINEERING AND TECHNOLOGY, GHANA (IET)**

2013



**PROFESSIONAL ENGINEER
INSTITUTION OF ENGINEERING AND TECHNOLOGY, GHANA (IET)**



**CERTIFIED MASTER TRAINER
INSTITUTION OF ENGINEERING AND TECHNOLOGY, GHANA (IET)**

- Certified to train craftsmen, draftsmen and Technicians in the Area of Automotive Engineering
- Certified to train engineers to upgrade training and improve job performance.

2013



**CERTIFIED TRAINER
GHANA INSTITUTION OF ENGINEERS**

- Obtained certification on valuation of plant and machinery.

RELEVANT PUBLICATIONS

- G.K. Ayetor, Innocent Mbonigaba, Albert Sunnu, Baafour Nyantekyi-kwakye (2021). Impact of replacing ICE bus fleet with electric bus fleet in Africa: a lifetime assessment. *Energy* Vol.221, Elsevier.
- G. K. Ayetor, David A. Quansah, Eunice A. Adjei (2020). Towards Zero Vehicle Emissions in Africa: A case study of Ghana. *Energy Policy* vol. 143. Elsevier
- G.K. Ayetor, Innocent Mbonigaba, M.N, Sackey, P.Y. Andoh (2021). Vehicle regulations in Africa: impact on used vehicle import and new vehicle sales. *Transportation Research Interdisciplinary Perspectives*, Elsevier.
- G.K. Ayetor, Innocent Mbonigaba, Joshua Ampofo, Albert Sunnu (2021). Investigating Road Vehicle Emissions in Africa: A case study of Ghana and Rwanda. *Transportation Research Interdisciplinary Perspectives*, Elsevier.
- Ayetor, G.K., Duodu, E. and Abban, J., 2016. Effect of Energy Storage Systems on Fuel Economy of Hybrid-Electric Vehicles. *International Journal of Technology and Management Research*, 1(5), pp.14-23.
- Ayetor, G.K., Gyamfi, G.B. and Larnor, E.T., 2013. Drive Cycle Performance of Hybrid-Electric Vehicles. *International Journal of Technology and Management Research*, 1(2), pp.1-6.
- M.A. Kesse, E. Buah, H. Handroos, G.K. Ayetor. Development of an Artificial Intelligence Powered TIG Welding Algorithm for the Prediction of Bead Geometry for TIG Welding Processes using Hybrid Deep Learning. *Metals*, 2020.
- Ayetor, G.K., Sunnu, A. and Parbey, J., 2015. Effect of biodiesel production parameters on viscosity and yield of methyl esters: *Jatropha curcas*, *Elaeis guineensis* and *Cocos nucifera*. *Alexandria Engineering Journal*, 54(4), pp.1285-1290.
- Ayetor, G. K., Albert K. Sunnu, and M. A. Kesse. "Engine performance and emissions of fuel produced from palm kernel oil." *Biofuels* (2019): 1-7.
- Sunnu, A.K., Ayetor, G.K. and Gaye, J.M., 2019. Straight vegetable oil fuel performance and exhaust emissions under turbocharged and naturally aspirated conditions. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, pp.1-11.
- Ayetor, G. K., Albert K. Sunnu, and M. A. Kesse. " Performance and Durability studies of Engine Run on preheated Crude Palm Kernel Oil." *International Journal of Ambient Energy* (2019): 1-9.
- Ayetor, G.K., Sunnu, A. and Parbey, J., 2015. Performance Evaluation of Biodiesel-Biodiesel Blends in a dedicated CIDI Engine. *International Journal of Renewable Energy Research (IJRER)*, 5(1), pp.168-176.
- Parbey J, Osei G, Arthur R, Ayetor G. Bioethanol potential from oil palm sap in Ghana. *International Journal of Renewable Energy Research (IJRER)*. 2014 Mar 20;4(1):54-60.
- Ayetor, G.K., Sunnu, A.K. and Gyamfi, G.B., 2017. Idling effect of injection pressure and timing and their effects on performance and emissions of a compression ignition engine fuelled with biodiesel. *Biofuels*, 8(3), pp.333-338.
- Ayetor, G.K., Sunnu, A. and Parbey, J., 2015. Effect of injection pressure and timing on biodiesel fuelled engine. *Journal of Automobile Engineering (jaue)*, 5(1), pp.1-18.
- Ayetor, G.K. and Sunnu, A.K., 2015. Engine performance of biodiesel-biodiesel blends at varying engine speeds. *African Journal of Science, Technology, Innovation and Development*, 7(6), pp.500-508.
- Ayetor, G.K., Parbey, J. and Osei, G., 2016. Durability studies of an indirect diesel engine run on raw palm kernel oil. *International Journal of Technology and Management Research*, 1(5), pp.42-50.

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