Isaac Ndawula

Curriculum Vitae

Mechanical Engineering Department,
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Education

02/2017 – 02/2019 **MSc in Mechatronics and Robotics Engineering,** from Egypt – Japan University of Science and Technology, Egypt.
CGPA: 3.43/4.00

08/2008 – 10/2012 **BSc in Agricultural Mechanization and Irrigation Engineering,** from Busitema University, Uganda.
CPPA: 4.22/5.00

02/2006 – 12/2007 **Uganda Advanced Certificate of Education ("A"– Level),** From Kyambogo College School, Kampala, Uganda.
POINTS: 19/25
Subjects Done: General Paper(C6), Physics (B), Chemistry(C), Biology(C) and Mathematics(B)

02/2002 – 12/2005 **Uganda Certificate of Education ("O"– Level),** From St. Peter's Nkokonjeru SS, Mukono, Uganda
DIVISION: 1(One)
Subjects Done: English(C6), Christian Religious Education(C6), History(D1), Geography(D2), Mathematics(D2), Physics(D1), Chemistry(D2), Biology(D2), Art (C5) and Commerce (C5)

Academic and Research Positions

07/2019 – Present **Ag. HOD, Mechanical Engineering, Assistant Lecturer-** Mechanical Engineering at Kabale University, Uganda

12/2018 – 06/2019 **Research Volunteer,** Electrical and Computer Engineering Department, at netLabs!UG, Mekerere University, Uganda

01/2018 – 12/2018 **Teaching Assistant,** Mechatronics and Robotics Engineering Department at Egypt – Japan University of Science and Technology**,** Egypt

04/2014 – 12/2016 **Assistant Lecturer,** Mechanical Engineering Section at Muteesa I Royal University, Uganda

Professional Positions

11/2012 – 03/2014 **Mechanical Engineer,** at Sirius Products, United Kingdom, Dubai Branch

Research activities

2019 – Present **Soft Robotic Spine.** In this project, a novel soft robotic spine is under development. The aim of this project is to provide support to human spine. This device shall be used for rehabilitation purpose and to reduce pain in human spine to people working in manufacturing industries. Both modern and traditional engineering design approaches are used. For this project, I serve as Main Supervisor, coordinating one

undergraduate student of Kabale University, Mechanical Engineering department.

Piezoelectric Vibration Energy Harvester. In this project, piezoelectric vibration energy harvesting from animal motion is under development. This energy harvester will help in providing energy to self-powered electronics used in smart agriculture. I serve as a Main Supervisor, coordinating one undergraduate student of Kabale University, Mechanical Engineering department.

2018 – 2019 **Passion Fruit Diseases Detector.** A passion fruit diseases detector was developed in this project. This detector helps farmers and agronomist with or without passion fruit diseases identification experience. The detector developed can be hand held or installed on the Unmanned Aerial Vehicle (UAV). Here, we used 4th Industrial Revolution technologies (Artificial Intelligence/Machine Learning/Machine Vision) to come up with the detector. I served as Project Advisor, for two undergraduate students of Makerere University, Electrical and Computer Engineering Department. The project was coordinated by Dr. Jonathan Seruganda and Mr. Mark Kangarura. Funded by netLabs!Ug. Publication relevant to these activities is labeled as (c1).

2017 – 2019 **Pot seedlings transplanting robot.** I developed a novel pot seedlings transplanting robot with high productivity of more 4 times and good performance as compared to the existing automated and robotic transplanters. This project was coordinated by Prof. Samy F.M. Assal and Funded by Egyptian and Japanese governments. Publication relevant to these activities is labeled as (p1, c2, c3).

Research Interests

Intelligent Systems, Artificial Intelligence and Robotics
Mechanical and Mechatronics Systems Design
Modeling and Simulation
Control Systems (Automatic Control, Optimal Control, Model Predictive Control, and Intelligent Control)
Materials Science
Optimization Methods (Numerical, Structural, Evolutionary and Combinatorial)
Learning Algorithms and Neural Networks, Image Processing and Vision Systems

Teaching activities

I have been teaching the following undergraduate courses: Design of machine elements; Advanced Mechanics of Machines; Materials Science; Research Operations and Optimization; Statistics for Engineers; Computer Aided Manufacturing (CAM); Computer Programming; Computer Aided Design (CAD); Engineering Mathematics, Engineering Mechanics (Dynamics and Statics), and Control Systems

Journals and Conferences Review Activities

I served a reviewer on National Conference on Communications (NCC), Artificial intelligence (AI) and Robotics section.

Publications

Patent(s)

[p1] **I. Ndawula** and S. F. M. Assal, “Multi-gripper 3−DOF translational robot for row−by−row pot seedling transplanting in field," Egypt Patent No. 2018/284, filed on 15th February, 2018

Conference(s)

[c1] **I. Ndawula,** D. Asiimwe, S. Mushakangoma and P. S. Musaazi, (2020), “Effective Application of 4th Industrial Revolution Technologies During Engineering Research and Teaching in Ugandan Universities”, The 2nd Annual Higher Education Conference, Hotel Africana Kampala, Uganda. March 16-17th 2020.

[c2] G. Namulondo, O. Nakayima, **I. Ndawula**, and J. Serugunda (2019). "A Deep Learning based Detector for Real-Time Plant Diseases Recognition." *2019 National Conference on Communications, Kampala Uganda*.

[c3] S. F. M. Assal and **I. Ndawula**, “Optimum Design and FEA of a Hybrid Parallel-deployable Structure-based 3-DOF Multi-Gripper Translational Robot for Field Pot Seedlings Transplanting” *ICINCO 2019 International Conference on Informatics in Control, Automation and Robotics, 2019,* Prague, Czech Republic

[c4] **I. Ndawula**, and S.F. Assal, (2018). "Conceptual Design and Kinematic Analysis of a Novel Open Field 3-DOF Multi-Gripper Pot Seedlings Transplanting Robot", *2018 IEEE International Conference on Mechatronics and Automation (ICMA)*, Changchun, Chain 1458-1463

Awards

[a1] **Best poster paper nomination:**
G. Namulondo, O. Nakayima, I. Ndawula, V. and J. Serugunda (2019). "A Deep Learning based Detector for Real-Time Plant Diseases Recognition." *2019 National Conference on Communications,* Kampala Uganda.

[a2] **Scholarship for MSc Eng. Studies,** from Egyptian Ministry of Higher Education, New Borg El Arab, Egypt, **02/2017 – 02/2019**

[a3] **Scholarship for BSc Eng. Studies,** from Ugandan Government, Busia, Uganda, **08/2008 – 08/2012**

Language(s)

English (Native Speaking)
Luganda

Skills and competences

Technical skills

I am familiar with bioinspired methodologies, and with the methods of extracting fundamental principles from nature to develop novel technological solutions. I have also experience in robot, mechanical, mechatronics design and construction, which specific knowledge on mechanism design. I studied and compared traditional innovation methods (such as TRIZ, QFD, Decision matrix, etc...) with respect to bioinspired methods. Even if I did not published yet on this topic, I am interested into the generation process of original ideas (and novel designs).

Computer Skills

I am a proficient user of CAD systems for mechanical design, with consolidate experience on SolidWorks, CATIA, CREO Parametric and Inventor, AutoCAD and basic knowledge of Design Sparks. I used extensively 3d printing technologies (FDM and resin-based printers), with Stratasys and MarkerBot 3d printers, to develop prototypes and low cost commercial components.

I have good programming skills in Matlab, Python and C++ languages. Most of my dynamical models were developed and solved in Matlab and Python using standard toolboxes and ad hoc prepared functions.

I am also a competent user of Finite Element Analysis (FEA) and mechanical dynamic analysis software. I use ANSYS for FEA and ADAMS for kinematic and dynamics analyses.

Social skills and Comptences

I have an excellent group working attitude, also in multi-cultural and multi-disciplinary teams, obtained working in African projects and in short term scientific missions. I undertook several international collaborations with colleagues from renowned foreign universities such as the Waseda University (modern mechanical, electrical and electronics engineers mainly) and the University of Zurich (computer scientists mainly). These collaborations enabled me to enrich my technical and communication skills, also in multi-disciplinary domains, i.e. among mathematics, computer science and engineering.

Synthetic indexes

H-index

Scopus: 1 Google Scholar: 1

Membership

IEEE member
ASME member
ASBAE member

Referees

Available upon request

June 24th, 2020