David Karibe

Curriculum Vitae

"People who are really serious about software should make their own hardware" -Alan Kay

Education

2005–2009 **Bachelor of Science**, *Physics (Electronics)*, The University of Nairobi, *Second Class Honours, Upper Division*.
Specialized in Applied Microprocessor Technologies and Instrumentation

Experience

Consulting

2018–current **Hardware/Firmware Engineer**, *Justus Technologies*.
Design and implementation of solar power monitoring IoT system using NXP K64F ARM cortex M4 and KW41Z ARM Cortex M0+ wireless controllers.

Responsibilities:

- Design of the embedded systems hardware including modeling and spice simulation, schematic capture, PCB Layout and preparation for manufacturing.
- Hardware testing and troubleshooting using digital meters, logic analyzers and oscilloscopes
- Firmware development in C and register level debugging.
- Agile development process management with version control using git and trello scrum boards
- Preparing BOMs and aiding in procurement of required components for the project
- 3D modeling and printing of product casing

2017–current **Co-founder and Lead Firmware Engineer**, *Sign-IO*.
Implementation of Bluetooth Low Energy(BLE) hardware and firmware in C using NXP KW41Z chips and Android application BLE integration.

Responsibilities:
- Capturing circuit schematics and designing PCB layouts for BLE embedded systems
- Developing firmware for BLE embedded systems using evaluation boards
- Building prototypes, testing and debugging firmware in the prototypes
- Agile development process management with version control using git and trello scrum boards
- Managing version control repositories for the development team
- Recruiting and training junior firmware developers

Past jobs

2010–2018 **Senior Technologist**, University of Nairobi, Physics Department.
In charge of innovation and research laboratories in the electronics and laser applications thematic sections. Developing content, reviewing and teaching practical units in embedded systems, workshop skills and computer programming.

Responsibilities:
- Designing embedded systems hardware and developing firmware for ARM Cortex-M targets for application in various innovation projects.
- Design and review of embedded systems and workshop skills practical laboratory courses for the department of Physics.
- Teaching and evaluating students in embedded systems, workshop skills and computer programming courses
- Offering technical support to researchers at the department in instrumentation and interfacing problems
- Facilitating and training in the University of Nairobi Solar Academy short course which happens at least twice every year.
- Facilitating and training in the University of Nairobi Electronics Academy short course for corporate at the Physics Department
- Repair, maintenance and development of new research set-ups
- Procurement of new equipment (computers, embedded development Kits and assorted electronics components, microscopic imaging systems)

Vocational

2008 **August Holiday Internship**, University of Nairobi, Physics Department, Industrial Electronics Unit.
Developed an embedded system for farming automation with sensors and actuators.

Detailed achievements:
- Learned and exercised problem solving techniques; brainstorming, problem definition and problem disintegration.
- Circuits design, PCB prototyping and hardware debugging
- Applied Micro-controller programming in C
- Project Documentation

Computer skills

Novice PERL

Intermediate	ASSEMBLY, JAVA, Android platform, HTML/CSS/JAVASCRIPT, Linux admin (Kernel and Userspace system configuration)
Advanced	C/C++ programming, Electronics Systems Modeling and Simulation in systemC, Algorithms design in Matlab/Octave, KiCAD Schematic and PCB Layout Design, ELectronics Spice Modeling and Simulation in ngspice, Documents formating in LaTeX, Openscad 3D modeling, PYTHON Programming, GNU/Linux user: building software from source, configuration, hardware interfacing, shell scripting, Git (Version Control and collaboration)

Embedded Development Skills

Software

Toolchains	ARM GNU toolchain: General set-up and configuration, building and debugging firmware. Build automation tools: Writing Makefiles to automate firmware build process
Debug Severs	OpenOCD, USBDM, Jlink and PE-micro: experience of use for debugging ARM targets including Freescale KL Series and ST Microelectronics' microcontrollers
IDEs	Eclipse (CDT and JDT) ,NXP Kinetis Design Studio, NXP MCUXpresso with Kinetis SDK and Android Studio.
Simulation	SystemC, ngspice and Matlab: Used in teaching and research work in post-graduate studies.
Wireless	Nordic NRF24L01+ ISM wireless platform, NxP KW41Z Bluetooth Low Energy Platform paired with an android application.
Interfacing	Research equipment interface to Linux OS including serial ports,usb spectrometers and digital cameras for Matlab platform data acquisition.
KiCAD EDA	Designing Schematics, Spice simulation, PCB layout routing and exporting PCB artwork in Gerber files for manufacturing.

Hardware

Prototyping	PCB prototyping using toner transfer method (double sided boards with rivetted vias) and ordering from professional services OSH Park and JLCPCB
Testing	PCB signal troubleshooting using digital meters, oscilloscopes and logic analyzers
Debugging	JTAG and Serial Wire Debug(SWD with ARM CMSIS-DAP)
Wireless	signal tracing using RF spectrum analyzer (SPECTRAN HF-6060 V4) for antenae testing

Workshop Skills

3D Modelling	OpenSCAD; precision 3D modelling for 3D printing and visualization models for electronics components to be used in PCB layout 3D inspection
3D Printing	Using Ultimaker2 printer with Cura slicing tool: For product prototyping; plastic housing for embedded systems boards, optic bench alignment custom and replacement components, new setups for holographic imaging and drone parts for a remote sensing project.

Technical Training

Multispectral Imaging and Remote Sensing

Remote Sensing Using lasers and telescopes in remote sensing, data analysis in Matlab, 2 Weeks at ICIPE-DUDUVILLE CAMPUS, Kenya (2011)

Multispectral Imaging Digital imaging labs, Flourescence imaging labs, MRI imaging, Image Processing in Maltlab, 3 months at Lund University, Sweden in 2012

Multifunctional Microscope Design of a multispectral bench microscope with Matlab, 2 weeks at Sally Mbuor, Senegal (2015)

Optical Simulation Matlab modeling and simulation of optical microscopic imaging systems, 2 weeks at University of Ouaga, Burkina Faso, (2017)

Photovoltaic Systems

Photovoltaics Trainer PV systems sizing and installation, 2 days at the Physics Department, University of Nairobi

Tailor-made Training in Photovoltaics PV labs, Grid-tie systems, Roof installation, Special flexible materials with applications on portable devices, 2 weeks at Delf University, Netherlands

Food and Energy trainer SUNfarming GmbH organized Food and Energy mixed PV systems and green house farming - Systems Design and Implementation - 2 weeks training programme at the North West University of Potchefstroom, South Africa

Languages

English **Fluent (Speaking, reading and writing)**

Swahili **Fluent (Speaking, reading and writing)**

Kikuyu **Native language**

Hobbies

- DIY and Electronics
- Travelling and Photography
- Blogging
- CAD and 3D printing

Referees

Allela Roy **Software Engineer**, *Intel Corporation*, Machine Learning and IoT.
- Phone: +254712893128
- email:allelaroy@gmail.com

James Gathu **Technology Integration Specialist**, *Escuela Campo Alegre*, Venezuela.
- Phone: +584140314601
- email:jamesmicwe@gmail.com

Dr.Justus Simiyu **Physics Lecturer**, *Maasai Mara University*, Physics Department.
- Phone: +254722630778
- email:jsimiyu08@gmail.com