

# Ciira wa Maina

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## CONTACT INFORMATION

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## SUMMARY

- Principal investigator of the Kenya bioacoustics project which leverages low cost electronics and machine learning for environmental monitoring. The project uses **deep learning** models for bird species recognition from audio recordings.
- Passionate researcher developing local solutions to problems in my immediate environment with potential global impact by leveraging my expertise in **signal processing, machine learning and electrical engineering**.
- Member of the organising committee of **Data Science Africa** which aims to improve machine learning expertise in Africa. We have organised capacity building events in Kenya, Uganda, Tanzania, Ethiopia and Nigeria since 2015.

## TEACHING & RESEARCH

Data Science, Machine learning, Education, Bioacoustics, Statistical signal processing, Computational Biology, Communication systems, ICT

## EMPLOYMENT

**Dedan Kimathi University of Technology**, Nyeri, Kenya

*Senior Lecturer, Electrical Engineering* **June 2015 to present**

*Chairman, Department of Electrical Engineering* **May 2014 to June 2018**

*Lecturer, Electrical Engineering* **September 2013 to May 2015**

- Led a team of 10 lecturers and 15 technologists to ensure quality teaching.
- Developed new teaching modules leveraging low cost electronics to improve teaching of electrical engineering.
- Awarded over USD 50,000 in research funds by actively writing research proposals and leveraging international partnerships.

**University of Sheffield**, Sheffield, UK

*Postdoctoral Research Associate* **October 2011 to August 2013**

- Developed **Gaussian process** models for analysis of data from high throughput biological sequencing experiments. This involved dealing with the complexity of real world data and developing software to move from data collection to processing.
- Lead author on a publication in PLoS computational biology (a leading journal in computational biology)

**Drexel University**, Philadelphia, PA USA

*Research and Teaching Assistant* **September 2007 to September 2011**

- Developed novel machine learning algorithms for **robust speech processing** and implemented them in software.
- Served as a teaching assistant for several undergraduate and graduate courses.

## EDUCATION

- **Drexel University**, Philadelphia, PA
  - Ph.D., Electrical and Computer Engineering, **September 2011**
- **University of Nairobi**, Nairobi, Kenya
  - B.Sc., Electrical and Electronic Engineering, **June 2007**

## RESEARCH GRANTS

- **National Research Fund Grant**: Part of team awarded KES 20 million to develop sensor systems leveraging the **Internet of Things** to monitor the Ewaso Ngiro ecosystem.
- **African Bird Club Grant** : *Testing the feasibility of an acoustic monitoring system for monitoring trends in species richness of forest birds in an important bird area*, **GBP 1,916**.
- **ESRC Grant** : Co-convenor on the project “Digital Development: Leveraging Data Science and Digital Participatory Practice for Development Impact”, 2017-2018. PI - Prof. Dorothea Kleine, University of Sheffield
- **Kenya Education Network Mini Grant** : *Re-imagining Electrical Engineering Education Using The Raspberry Pi*, **USD 10,000**.

## TEACHING

- **Dedan Kimathi University of Technology and Drexel University**: Digital Signal Processing, Signals and Systems, Artificial Intelligence, Circuit Theory.

## RECENT PUBLICATIONS

1. C. wa Maina, “IoT at the Grassroots - Exploring the Use of Sensors for Livestock Monitoring,” In *IST-Africa 2017*, Windhoek, Namibia.
2. C. wa Maina, D. Muchiri, and P. Njoroge “A Bioacoustic Record of a Conservancy in the Mount Kenya Ecosystem”. *Biodiversity Data Journal*, (4), 2016.
3. C. wa Maina, “Cost Effective Acoustic Monitoring of Bird Species,” In *Interspeech 2016*, San Francisco, USA.
4. C. wa Maina, A. Muhia, and J. Opondo “A Low Cost Laboratory for Enhanced Electrical Engineering Education,” In *IST-Africa 2016*, Durban, South Africa.
5. C. wa Maina, *et al.*, “Inference of RNA Polymerase II Transcription Dynamics from Chromatin Immunoprecipitation Time Course Data,” *PLoS Comput Biol* 10(5): e1003598. doi:10.1371/journal.pcbi.1003598 2014
6. Ciira wa Maina and John MacLaren Walsh. “Joint Speech Enhancement and Speaker Identification Using Approximate Bayesian Inference,” *IEEE Transactions on Audio, Speech, and Language Processing*, vol. 19, no. 6, pp. 5491 – 5510, Aug. 2011.

## PROGRAMMING

Python, Jupyter Notebooks, Pandas, Scikit-learn, TensorFlow, Stan, C