Fabusuyi Akindele Aroge

Energy Systems
Data Scientist
Simon Fraser University (SFU), Vancouver, Canada

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I research energy system performance characteristics using computational, statistical and signal processing techniques.

- I am currently a researcher at FCReL, SFU, working on zero-emission fuel cell efficiency improvement, leveraging advanced 3D X-ray image analysis.
- I maintain a technical blog, Playground, to share tutorials and opinions related to statistics, data science, scientific computing, and beyond.
- I invest a significant amount of time in teaching computational and statistical methods to undergraduate students.
- Outside my employment, I participate in the broader data science community.

Education

PhD 2019-present
Department of Sustainable Energy Engineering, Simon Fraser University, Canada
advised by Prof. Erik Kjeang
Focus: Understanding fuel cell water transport using *operando* X-ray imaging.

MS 2017-2019
Department of Electrical Engineering, University of Cape Town, Cape Town, South Africa
advised by Paul Barendse
Thesis: Impedance Spectroscopy Techniques for Condition Monitoring of Polymer Electrolyte Membrane Fuel Cells

BS 2009-2014
Federal University of Tech., Akure, Nigeria
Major: Electrical & Electronics Engineering

Others

Micro Masters Jan. 2019-Dec. 2019
Institute for Data, Systems, and Society Massachusetts Institute of Technology (MIT)
Modules: Probability | Machine Learning with Python: from Linear Models to Deep Learning | Fundamentals of Statistics | Data Analysis in Social Science—Assessing Your Knowledge

MOOCs List of online courses and specializations completed.

Computing

I have some active computing projects, including packages developed as part of some of my theses. See my github profile (https://github.com/akin-aroge) for details.

Skills

- Experienced (industry & academia) data scientist, with a specialization in scientific computing, including visualization, data mining and machine learning.
- Python Language with over 4 years of experience particularly with the Python scientific stack (NumPy, Pandas, matplotlib, scikit-Learn, SciPy).
- Experience with a variety of tools and languages, including SQL, R, bash, Git, Jupyter notebooks, MATLAB, LaTeX, Microsoft Azure cloud computing platform.
- Author of *Playground*, a Python blog covering scientific computing, visualization, statistics, and related topics: https://akin-aroge.github.io/

Experience

Employment

FCReL, SFU
2019–present
Doctoral Research Associate,
Fuel Cell Research Lab, School of Sustainable Energy Engineering, Vancouver

- I have developed an image analysis technique for quantifying liquid water in radiographic images
- I have developed a technique for summarizing fuel cell water interactions using principal component analysis
- I have developed a computational framework for analyzing fuel cell water instabilities during X-ray imaging.

Sun Lab, SFU
Fall 2021
Data Scientist (Bio-informatics),
Sun Research Lab, Department of Chemistry, Vancouver

- I developed data engineering pipelines in python to automate analysis of body-wide transcriptome data
- I investigated differential gene expressions and organ relationships for mouse disease models
- I developed network visualizations of body-wide transcriptome profiles to inform analysis and interpretation of results, using Python

Rhino Africa
Jan. 2018–Dec. 2020
Data Scientist — Exploration and Modelling
Rhino Africa, Cape Town, South Africa

- I implemented an optimised personnel schedule algorithm which reduced customer turnaround time from 17hrs to 7hrs
- I developed a time series analysis model showing the key variables influencing daily customer request rates to aid planning
- Investigated the impact of the water crisis in Cape Town on the business using internal and external data sources (such as tweets) to inform business strategy
- I also provided technical advice on various analytical projects and products across the business

AMES, UCT
Mar. 2017–Jul. 2018
Research Associate
Advanced Machines & Energy Systems (AMES) Lab, University of Cape Town, South Africa.

- I designed and developed (hardware & software) a novel low-cost diagnostic system for rapidly assessing fuel cell performance using composite signals
- I developed relevant computational libraries for automated signal processing and analysis for the research lab using MATLAB and Python programming languages
- I developed and published new methods for assessing fuel cell real-time performance using wavelet analysis

Co-Creation Hub
Oct. 2016–Jan. 2017
Data Analyst (Intern)
Co-Creation Hub, Yaba, Lagos, Nigeria.

- I processed and analyzed survey towards researching the Tech. Talent Gap in Nigeria
- I informed strategy on the national coverage of startup incubation program using demographic and temporal data
- I was responsible for assessing and making recommendations for the startup idea submission data collection system

GENI
Sep. 2013–Feb. 2014
Remote Energy Research Associate
Global Energy Network Institute (GENI), San Diego, California, USA

- I conducted research on behalf of the institute on important energy issues in Nigeria such as energy efficiency, renewable energy integration and smart grid prospect
- I published a culminating research article titled, The Smart Grid and Renewable Energy Integration in Nigeria

Volunteering

Advisory Council
Fall 2020
As a member of the Developmental Advisory Council, SFU Strategic Sustainability Plan, I advised on the relevant components on the constitution of the advisory council.

Mastercard Mentorship
2018-2019
As a Mastercard mentor, I provided practical guidance, motivation and support to two mentees in the areas of academic trajectory, and navigating the university life in general.

Simunye
2018-2019
As a member of Simunye, I joined other members to build a support system for the homeless around Rondebosch, Cape Town, South Africa.

Teaching Assistantship

BUS 336 Data and Decisions II
Summer 2021 *Simon Fraser University*

SEE 241 Measurement and Data Analysis
Summer 2021 *Simon Fraser University*

BUS 232 Data and Decisions I
Spring 2021 *Simon Fraser University*

SEE 242 Computational Methods for Engineers
Spring 2020 & 2021 *Simon Fraser University*

AWARDS & HONORS

TELUS Grad Award Awarded the *TELUS Graduate Award*. School of Sustainable Energy Engineering, SFU.
2021

NRF, UCT National Research Foundation (NRF) *research grant nomination* award. UCT.
2019

UCT Scholarship UCT International Postgraduate Student Scholarship award
2018

IEEE ICAST Recipient of the *Best paper award* in the 14th session of the 6th IEEE ICAST conference
2014

PUBLICATIONS

Articles

[1] F.A. Aroge. *et al.* *Method for Analyzing 2D X-Ray Transmission Images for Operando Liquid Water Distribution in a Polymer Electrolyte Fuel Cell* ECS Meeting Abstracts, 2021

[2] F.A. Aroge, P. Barendse, *Multi-Frequency Signal Synthesis for Accurate Fuel Cell Impedance Estimation* IEEE Energy Conversion Congress and Exposition (ECCE), 2019

[3] F.A. Aroge, P. Barendse. *Signal Injection by Active Load Modulation for PEM Fuel Cell Diagnostics* IEEE PES/IAS PowerAfrica, 2018

[4] F.A. Aroge, P. Barendse. *Time-Frequency Analysis of the Chirp Response for Rapid Electrochemical Impedance Estimation* IEEE Energy Conversion Congress and Exposition (ECCE), 2018

[5] O. Oladeji, F.A. Aroge. *Priority-based autonomous load control in dynamic pricing environments* IEEE 6th International Conference on Adaptive Science & Technology (ICAST), 2014
(Adjudged *Best paper in the 14th session of the 6th ICAST*)

[6] F.A. Aroge, P. Meisen. *The Smart Grid and Renewable Energy Integration in Nigeria* IEEE Energy Conversion Congress and Exposition (ECCE), 2018